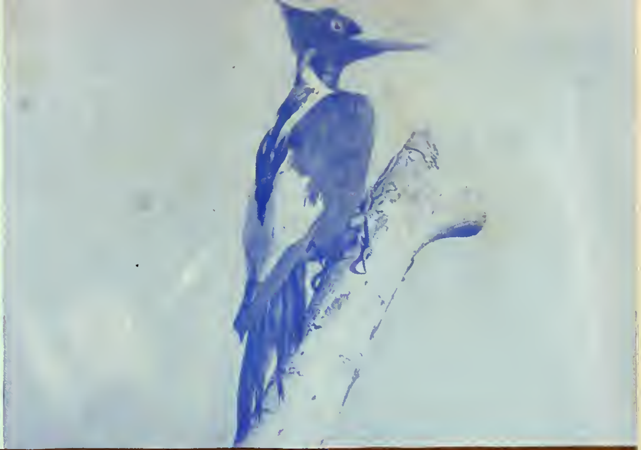
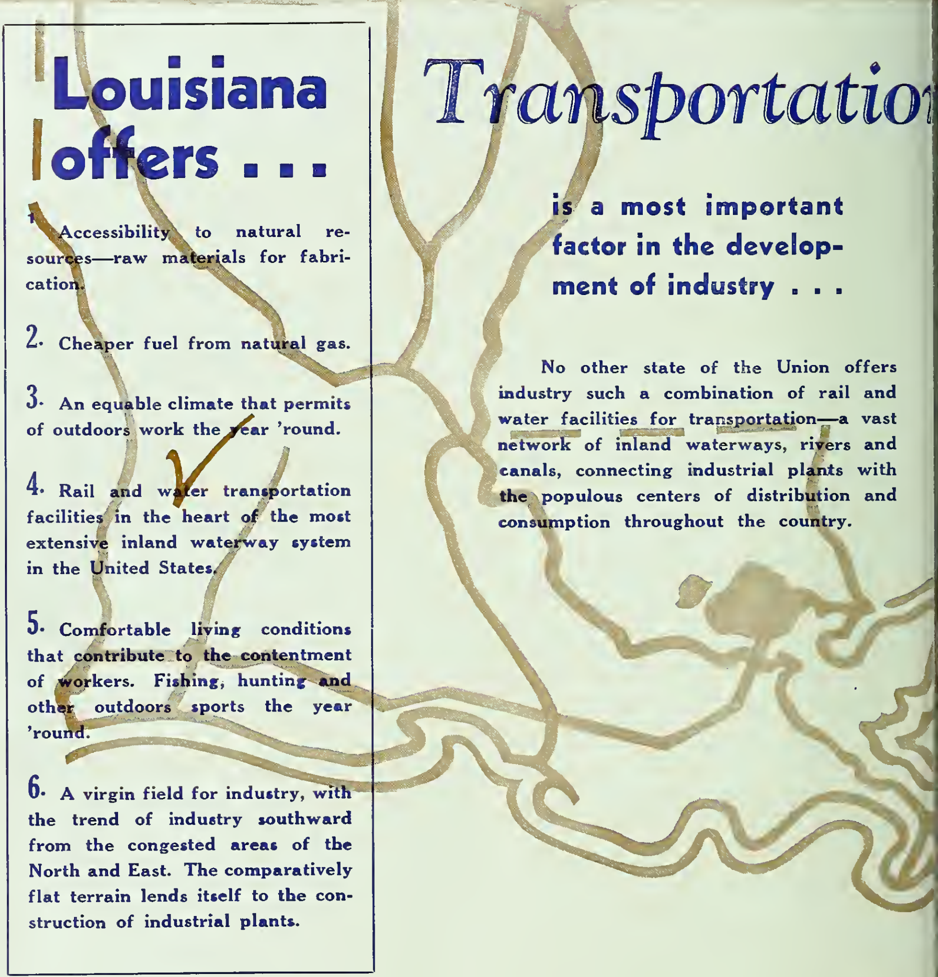


Louisiana CONSERVATION REVIEW

DEPARTMENT OF CONSERVATION, STATE OF LOUISIANA. WINTER, 1940-4



Louisiana offers . . .

1. Accessibility to natural resources—raw materials for fabrication.

2. Cheaper fuel from natural gas.

3. An equable climate that permits of outdoors work the year 'round.

4. Rail and water transportation facilities in the heart of the most extensive inland waterway system in the United States.

5. Comfortable living conditions that contribute to the contentment of workers. Fishing, hunting and other outdoors sports the year 'round.

6. A virgin field for industry, with the trend of industry southward from the congested areas of the North and East. The comparatively flat terrain lends itself to the construction of industrial plants.

Transportatio

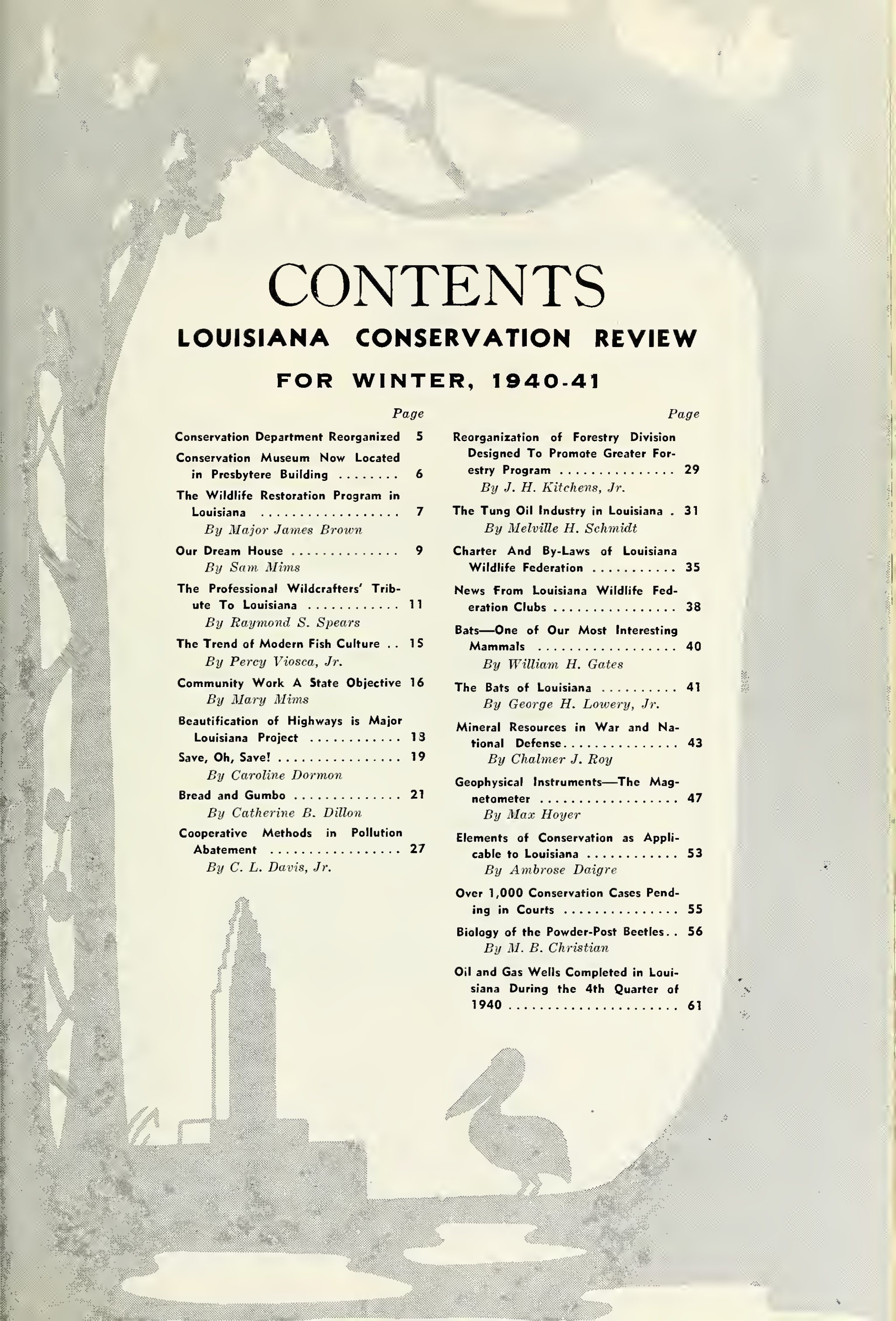
is a most important factor in the development of industry . . .

No other state of the Union offers industry such a combination of rail and water facilities for transportation—a vast network of inland waterways, rivers and canals, connecting industrial plants with the populous centers of distribution and consumption throughout the country.

DEPARTMENT OF CONSERVATION

W. H. HODGES, JR., Director

STATE OF LOUISIANA



CONTENTS

LOUISIANA CONSERVATION REVIEW

FOR WINTER, 1940-41

Page

Conservation Department Reorganized 5

Conservation Museum Now Located in Presbytere Building 6

The Wildlife Restoration Program in Louisiana 7
By Major James Brown

Our Dream House 9
By Sam Mims

The Professional Wildcrafters' Tribute To Louisiana 11
By Raymond S. Spears

The Trend of Modern Fish Culture .. 15
By Percy Viosca, Jr.

Community Work A State Objective 16
By Mary Mims

Beautification of Highways is Major Louisiana Project 18

Save, Oh, Save! 19
By Caroline Dormon

Bread and Gumbo 21
By Catherine B. Dillon

Cooperative Methods in Pollution Abatement 27
By C. L. Davis, Jr.

Page

Reorganization of Forestry Division Designed To Promote Greater Forestry Program 29
By J. H. Kitchens, Jr.

The Tung Oil Industry in Louisiana . 31
By Melville H. Schmidt

Charter And By-Laws of Louisiana Wildlife Federation 35

News From Louisiana Wildlife Federation Clubs 38

Bats—One of Our Most Interesting Mammals 40
By William H. Gates

The Bats of Louisiana 41
By George H. Lowery, Jr.

Mineral Resources in War and National Defense............... 43
By Chalmer J. Roy

Geophysical Instruments—The Magnetometer 47
By Max Hoyer

Elements of Conservation as Applicable to Louisiana 53
By Ambrose Daigre

Over 1,000 Conservation Cases Pending in Courts 55

Biology of the Powder-Post Beetles .. 56
By M. B. Christian

Oil and Gas Wells Completed in Louisiana During the 4th Quarter of 1940 61

Louisiana CONSERVATION REVIEW

SAM H. JONES, Governor
W. H. HODGES, JR., Director
J. A. PARTRIDGE, Executive Assistant
MARVIN O. POTTER, Secretary
GEO. A. WILSON, Attorney
EDMUND B. COPE, Cashier
W. L. HARMAN, Chief Accountant
J. N. GOWANLOCH, Biologist

ISAAC D. CHAPMAN
Editor

JOHN G. McCLOSKEY, Publicity and Education
D. L. SIMON, Enforcement
ARMAND P. DASPIT, Fur
J. N. McCONNELL, Oysters and Waterbottoms
JAMES BROWN, Fisheries and Wildlife
M. E. BRASHEARS, Forestry
WM. H. CHISHOLM, Research

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Vol. IX **WINTER, 1940-41** **No. 4**

AMONG OUR AUTHORS

Catherine B. Dillon, the author of "Bread and Gumbo", is a native New Orleanian, has written for publication since childhood, and contributed poems, art criticism and articles to the Houston Chronicle, Chicago Evening Post, and the New Orleans newspapers. Miss Dillon is now on the Louisiana Writers' Project staff editing material for a forthcoming volume, "Louisiana Folklore".

Melville H. Schmidt, who writes of "Louisiana's Tung Oil Industry", first became interested in tung oil when he wrote a thesis on the subject in his senior year at Tulane University. He graduated from Tulane in June, 1940, and is now connected with the Louisiana Department of Revenue as a traveling auditor.

Other contributors include Major James Brown, Director of the Division of Fisheries and Wildlife of the Department of Conservation; Sam Mims, Planning Technician, Louisiana Planning Commission; C. L. Davis, Jr., Chemical Engineer, Division of Research and Statistics; J. H. Kitchens, Jr., Associate Forester; Mary Mims, Extension Sociologist Louisiana State University; Max Hoyer, Geophysical Engineer, Division of Oysters and Water Bottoms; Caroline Dormon, Highway Beautification Consultant of Department of Highways; Ambrose Daigre, Assistant Director Conservation Museum; William H. Gates, Head Zoology Department, L. S. U., George H. Lowery, Jr., Curator Museum of Zoology, L. S. U., and others.

FEATURES OF SPRING NUMBER

"Tally Ho" is the title of a most interesting article by Mary Land Lock, a staff member of the Division of Publicity and Education of the Department of Conservation. The article tells the history of what is considered one of the oldest hunting clubs in the nation located right here in Louisiana. Our readers will find this one of the most interesting features of our Spring issue.

Dr. James Nelson Gowanloch, Chief Biologist of the Department of Conservation has an interesting and educational article entitled, "Louisiana's Picturesque Wildlife Names". Perhaps nowhere in the world do there exist more picturesque names for wildlife than in Louisiana. Dr. Gowanloch tells about some of these names and how they were derived in this interesting article.

"A Fisherman's Degree", is the title of an article on fishing by Sam Mims, Planning Technician of the Louisiana Planning Commission. History, philosophy and humor are interwoven to make this a most interesting article.

Dr. E. S. Hathaway, Professor of Zoology at Tulane University, contributes an article for our Spring Number on a subject of great educational value.

The above and many other features will appear in the Spring Issue of the Louisiana Conservation Review, which will be off the press the latter part of April.

ABOUT OUR COVER

Our readers are doubtless familiar with the emblem of the State of Louisiana which appears in the upper left-hand panel of our cover, but perhaps less familiar with the majestic looking bird on the right. This is a rare photograph of the Ivory-billed Woodpecker, a North American bird that is close to extinction. The few remaining species in the entire world are said to exist in a forest in Northeast Louisiana.

In the bottom panel appears a habitat group of the famous Louisiana muskrat which has been so much in the news during the past few months. The muskrat is Louisiana's leading fur-bearing animal. Heavy storms last winter drowned large numbers of these animals, yet Louisiana's fur trapping season which officially ended February 1st, was the most successful from a financial standpoint in over ten years. Pelts sold for $1.05 this season as compared to 55c per pelt the last season.

A state-federal muskrat restoration project is about to be undertaken by the Louisiana Department of Conservation.

The habitat group of muskrats pictured on the cover was made up by taxidermists of the Department of Conservation and is among the thousands of exhibits that may be seen at the Conservation Museum in New Orleans.

When in New Orleans, don't fail to visit the Louisiana Conservation Museum, now located in the Presbytere Building next to the famous St. Louis Cathedral and across the street from the renowned Jackson Square. You are welcome.

Conservation Department Reorganized; Director and New Board Appointed

The Department of Conservation of the State of Louisiana was officially reorganized on February 1st, when Governor Sam H. Jones signed an executive order providing for a separate Department of Conservation and a new Department of Minerals. At the same time the governor formally announced the appointment of W. H. Hodges, Jr., prominent North Louisiana planter and business man, as Director of the Department of Conservation.

Under the Reorganization Act and executive order of the Governor, the Department of Conservation will henceforth concern itself only with activities pertaining to fish, oysters, forestry, fur, game and other wildlife, while everything pertaining to gas, oil, sulphur and other minerals will come under the jurisdiction of the new Department of Minerals. Joseph L. McHugh, Jennings automobile dealer and former oil man, has been named Director of the Department of Minerals and the Minerals Department has been moved to Baton Rouge and is now located on the ninth floor of the state capitol building. The Department of Conservation continues its headquarters in the Civil Courts Building in New Orleans.

A few days following the issuance of the executive order formally setting up the Department of Conservation on the reorganized basis, Governor Jones announced the appointment of a nine-man board provided for in the Reorganization Act. The members of the board of the new Department of Conservation are as follows:

John M. Parker, Jr., New Orleans cotton dealer; Gordon Y. Millet, Houma wholesale oil dealer, and William Nalty, Hammond lumberman, all for three-year terms; N. Hobson Wheless, Shreveport oil and real estate company president; P. A. Bloomer, Fisher, Lumberman, and Andre Olivier, St. Martinville merchant, all for six-year terms; Fred J. McCormac of New Orleans, president of the Louisiana Wildlife Federation; Glen L. Shadow, Ruston sportsman, and Charles V. Holbrook, DeRidder lumberman, all for nine-year terms.

W. H. HODGES, Jr., Director of Department of Conservation

The new director of the Department of Conservation is a native of Louisiana and has long been prominently identified with and active in political and civic affairs in the state. He is a resident of Elm Grove near Shreveport. He is president of the Red River Improvement Association, a former director of the Shreveport Chamber of Commerce and has held other important civic posts in Shreveport. His brother, General C. B. Hodges, is in charge of the Army training camps at Camp Beauregard near Alexandria and Camp Shelby near Hattiesburg, Mississippi.

Mr. Hodges succeeds Major B. A. Hardey, Shreveport independent oil man, who resigned on February 1st, after serving as head of the Conservation Department since May 15, 1940, when Governor Jones assumed office. Major Hardey assisted in the reorganization program of the department and then resigned to return to private business.

The Department of Conservation as now constituted has nine divisions, all of which are located under one roof in the Civil Courts building in New Orleans. The divisions are as follows:

Administration, Accounting, Enforcement and Fisheries, Furs, and Wildlife, Oysters and Waterbottoms, Forestry, Publicity and Education, Research and State Parks.

The new board of the Department of Conservation, which is to act in an advisory capacity, is expected to hold its first meeting in the near future. Officers of the board are expected to be elected at that time. The director of the Department of Conservation is an ex-officio member of the board.

Governor Jones described the work of Major Hardey as "outstanding and phenomenal" and declared that under the Reorganization program, the Department of Conservation was now in better position to render more efficient service to the people of the State.

Conservation Museum Now Located In Presbytere Building In New Orleans

In line with the State of Louisiana's Reorganization program to provide better and more efficient service to the people of the State and at the same time practice economy, the Department of Conservation has moved its museum located for many years at 239 Royal street, New Orleans, to the state-owned Presbytere building at 715 Chartres street next to the famous St. Louis Cathedral.

The Presbytere building has for many years housed the Louisiana State Museum of Natural History and the many fish, game and wildlife exhibits of the Department of Conservation have been merged with the displays of the Louisiana State Museum giving visitors an opportunity to see under one roof one of the largest collections of educational and historical exhibits assembled in the United States.

The museum located across the street from the famous Jackson Square in New Orleans is on the regular route of all the commercial sightseeing lines in New Orleans, and for that reason it is expected that many more thousands of people will visit the museum annually than before.

The Conservation museum is operated by the Division of Education and Publicity of the Department of Conservation. A staff of experienced taxidermists are constantly adding new specimens to the collection of exhibits in the museum.

An attractive lecture room, with a seating capacity of several hundred, has been arranged on the first floor of the museum building. A large selection of motion pictures on varied wildlife subjects are available to be shown to schools, garden clubs, civic and conservation organizations upon request.

Since May 15, 1940, the Division of Education and Publicity has begun a large scale program of conservation education, and work on this program is being carried out on many fronts.

A series of monthly bulletins on varied conservation subjects are being sent to all schools in the state, and this phase of the education program has received the whole-hearted endorsement and support of the State Department of Education. It is eventually hoped to have textbooks on conservation in all schools in the state and to make conservation study a regular part of the schools' curriculum.

Believing that visual education is important, the Division of Education, has assembled a large number of motion pictures on conservation subjects, and new films are in the process of preparation. The work is being done by an experienced photographer who is on the staff of the Division. A film-loan service has been inaugurated to all schools and organizations requesting them. The demand for these films has been greater than the supply. The following films are available for showing to groups:

"The Fur Bearing Animals of Louisiana" (Sound).

"Going Fishing" (Sound).

"Where to Now?" (Silent).

"Conservation of Natural Resources" (Sound).

"How Nature Protects Animals" (Sound).

"Game Birds of the Marsh" (Silent).

"Louisiana Sea Birds" (Silent).

A lecturer of this Division travels throughout Louisiana giving lectures on conservation to schools, wildlife organizations, business and social clubs, and his services have been very much in demand. Lecturers and motion pictures will be supplied by the Division of Education to all organizations requesting same from the Conservation Department.

The Department of Conservation extends an invitation to everyone to visit the museum The next time you are in New Orleans, make it a point to see these interesting and educational exhibits. Staff members of the Division of Education are always on hand to show you through the museum and to answer questions.

■ **Left, interior view of the spacious and comfortable lecture room in the Conservation museum, where motion pictures are also shown; Right, a view of the Presbytere Building across from famous Jackson Square, the new home of the Conservation museum.**

The Wildlife Restoration Program In Louisiana

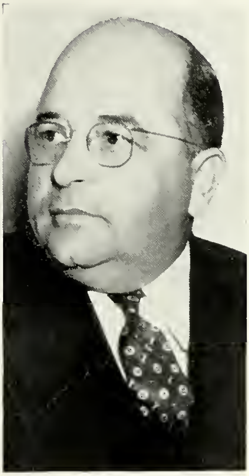
by
Major James Brown

The Pittman-Robertson Act of 1937 makes possible Federal-State programs to check the rapid depletion of our wild life resources. The existence of wildlife has been increasingly menaced by drought, floods, soil erosion, drastic changes in occupancy and uses of our lands, the destruction of faunal habitat, and by the fact that the supply of natural food and cover is ever diminishing.

Recognizing the fundamental principle that wildlife is inescapably linked with the land, our program must provide for suitable environment in which wild birds and mammals may live and multiply.

The increasing interest in outdoor recreation owing to the improvement of roads and to the increased number of days that our average worker has from his work, as well as to modern transportation has added a heavy drain on our wildlife resources. A vast sum is spent annually by hunters for firearms and ammunition. Approximately 6,500,000 hunters purchase a hunters' license and pay to the forty eight states about $12,000,000.00 a year for the privilege of hunting.

Because of these facts, Congress passed the Pittman-Robertson Act and now can contribute materially in our Wildlife Restoration Program. Under the terms of the Act an amount equal to the revenue accruing each fiscal year from the 10% Excise Tax impressed on firearms, shells and cartridges is authorized to be set apart in the Treasury in a special account to be known as The Federal Aid to Wildlife Restoration Fund. This amount is authorized to be appropriated and made available until expended for carrying out the purposes of the Act.



MAJOR JAMES BROWN

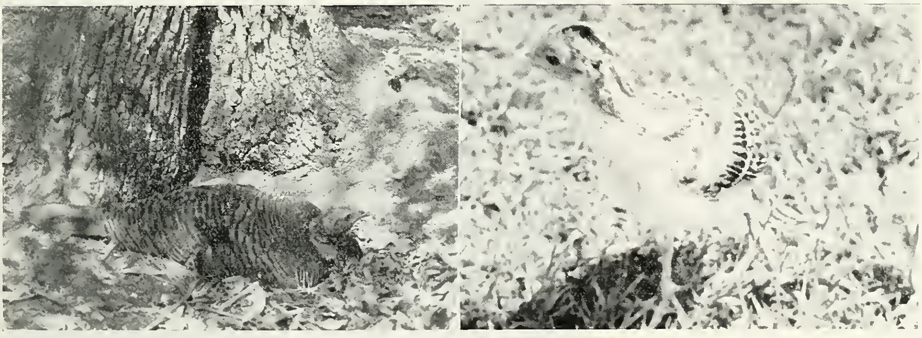
Considered one of the foremost authorities on wildlife in the nation, will direct the expenditure in Louisiana of the Federal funds granted through the Pittman-Robertson act. Major Brown was formerly director of the Kentucky Fish and Game Division. He is president of the American Fisheries Society.

LOUISIANA IS ELIGIBLE FOR FEDERAL FUNDS

In order that a State may qualify to receive the benefits of Federal aid from this Act, its Legislature must assent to the provisions of the Pittman-Robertson Act, which requires that the State shall have passed laws for the conservation of wildlife, which shall include a prohibition against the diversion of license fees paid by hunters for any other purpose than the administration of said State Fish and Game Department.

Under the terms of this Act, the United States may pay 75% of the cost of work performed on approved projects concerned with the purchase and development of lands, the restoration of natural environment, and the carrying on of research into problems of wildlife management.

After making deductions for administering this Act, apportionments of funds are made to the States, half in the ratio that the area of each State has to the



(Photos courtesy Virginia Game Commission.)

■ **A turkey propagation project will be among those undertaken in Louisiana through Pittman-Robertson funds. Above left, a wild turkey hen on nest, and right, a young wild turkey about one week old.**

total area of all the States, and half in the ratio that the number of paid hunting license holders of each State in the preceding fiscal year, as certified to the Secretary of the Interior by the State Fish and Game Department, bears to the total number of paid hunting license holders of all the States. Any part of an appropriation unexpended at the close thereof can be made available for expenditure in that State until the close of the succeeding year.

An appropriation of $2,500,000.00 was made for the fiscal year ending June 30, 1941. Of this sum there was apportioned for the State of Louisiana on the basis of our 31,043,840 acres, $18,429.82 and on the basis of our paid license holders for the fiscal year 1939, who numbered 92,432, we were apportioned $14,257.81, making a total Federal apportionment of $32,687.63. The State of Louisiana contributes $10,895.88, which makes a total of $43,583.51 for projects under the Pittman-Robertson Act.

LAND ACQUIRED BECOMES PROPERTY OF STATE

It is a basic requirement that all projects shall be substantial in character and design. Depending upon objectives, they will embrace activities in the groups as follows:

1. Land purchase for wildlife rehabilitation.

2. Land development to make areas more suitable for wild mammals and birds. This may be the development either of newly acquired lands or of areas already in public ownership. Development may reasonably be interpreted to include any project that would make better wildlife management possible, but each one should center particularly around environmental improvement by food and cover planting, water stabilization, or other activities necessary to accomplish the purpose.

3. Research directed to the practical solution of problems in wildlife restoration. These problems involve unknown factors in management, in feeding habits, and in the relationships of various species to each other and to livestock production and farming operations. These studies will be limited strictly to those having practical application.

Any areas acquired under the provisions of this Act become the property of the State and will be maintained and administered under our State laws. All structures built and all equipment purchased with these cooperative funds incident to the necessary performance of approved work likewise become State property.

The first project will be a study of the muskrat. This fur bearer has a great economic value and although his principal habitat is our coastal areas, his range covers the entire State and it is felt the upland specie can be developed to be of much greater value than it is at the present.

A quail project will be started as soon as possible with special emphasis on the environmental problems. Our cut-over lands and the increase in cattle has developed problems that must be solved.

Turkey and deer projects will also be started in the near future.

We believe that these projects, with the help of the Louisiana Wildlife Federation and all other conservation groups, will rapidly return the wildlife population to the numbers that our woods and fields can support.

Protect Game and Fish. Wise Conservation pays.

WIDER MARKETS FOR FISH NEW CONSERVATION PLAN

More fish more often on more American dinner tables is the goal set under new marketing plans incorporated in the national conservation program of the Fish and Wildlife Service recently reported to Secretary of the Interior Harold L. Ickes.

Under the plan approved by representatives of the fisheries industries, agents stationed at seaboard production points and interior market centers will collaborate in the distribution of surplus supplies and stimulate interest of retailers and wholesalers in wider marketing of the sea food, while the industry cooperates by reminding the consuming public of the value of aquatic products.

PHOTOGRAPHS ON WILDLIFE SUBJECTS WANTED

The Conservation Review needs more photographs on Louisiana conservation subjects, fish, game, birds, trees, wildflowers, rivers and lakes.

We would appreciate you amateur photographers who are readers of the Louisiana Conservation Review to send us prints of subjects mentioned above.

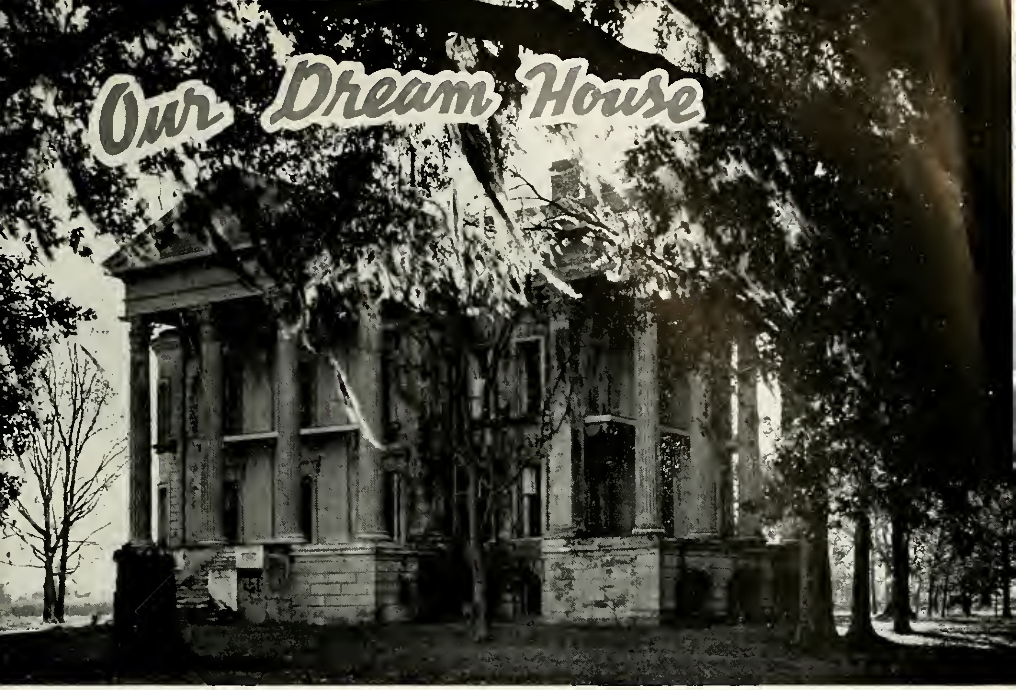
Of course we cannot pay any cash for these contributions but we will give a credit line whenever we use them.

Just enclose these photographs in an envelope with a letter explaining the subject matter and mail to the Louisiana Conservation Review, Civil Courts Building, New Orleans, La.

When in New Orleans, don't fail to visit the Louisiana Conservation Museum, next to the famous St. Louis Cathedral and across the street from the renowned Jackson Square. You are welcome.

■ The muskrat, one of Louisiana's most valuable fur-bearing animals, will come in for immediate attention under the Pittman-Robertson restoration projects. The muskrat crop this year was short, due to damage inflicted during heavy storms last winter.

Our Dream House



BEAUTIFUL BELLE GROVE

by
Sam Mims *

Twenty-five miles from our State Capitol at Baton Rouge the most elegant plantation house ever built in America is crumbling to ruins. Abandoned as a place of residence, it has been, for a score of years, the shrine of a few faithful dreamers; it has been an inspiration for several artists and writers, but in its state of decadence it has failed to stimulate motivation on the part of more prosaic men and women who are in position to do something about it. Painters have gone there and attempted to reincarnate its living spirit upon canvass; writers and photographers, historians, architects and artisans still journey to the hallowed old house and marvel at its austere beauty. Sentimentalists go there, brush tears from their eyes, and wonder why such a magnificent structure is left to the ravages of time. Many of the bricks have fallen from the walls and are returning to dust from which they were made, all because those of us who appreciate the aesthetic value of such a building have failed in our duty to stimulate definite action through some of our state agencies.

Belle Grove is a monument to that period of history that Charles Gayarré described: "Louisiana was in as high a state of prosperity as ever any land was blessed with . . . . . Her face was beaming with joy and hope . . . . . when wealth was her handmaid."

"FINEST HOUSE IN LOUISIANA"

This condition of affluence must have greatly inspired John Andrews, the ambitious gentleman from Virginia, who declared that he would build "the finest house in Louisiana . . . . . one that will shelter my descendants forever."

Four thousand acres of land in Iberville Parish, bordering the Mississippi River, and adorned with giant liveoaks, was the ideal setting for such a dream house. But Andrews, realizing his limitations, must find an architect of rare talent, one who possessed romantic vision as well as technical proficiency.

James Gallier was a world-famous architect. He had come to New York from Ireland. He had visited New Orleans and was fascinated by the charm of the southern metropolis. Would the great Irishman listen to a vague description of John Andrews' dream house and make any effort to infuse into necessary brick and mortar a spirit of romance?

An appointment was made and John Andrews boarded the river steamer at White Castle and went to New Orleans where the noted architect listened, at first, with professional courtesy, but finally burst into expostulations. "We will build the finest plantation house in America," he declared.

And so it was, that John Andrews, Virginian, employed the great Gallier to design and superintend the construction of his dream house, and the romantic, beauty-loving Irishman fulfilled his promise to "build the finest plantation house in America."

Belle Grove has been described in books, in magazines, and in newspapers.

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* Planning Technician, State Planning Commission.

Here is a side view of Belle Grove, considered one of the most elegant plantation houses ever built in the United States.

It is not the purpose here to add more superlatives to this collection of published materials, or to improve such statements as, "No drawing can show its mammoth proportions . . . . . massive in structure and exquisite in detail . . . . . The rooms and the great hallway would do credit to a palace in the grandeur of their scale and the elegance of their proportions."

COST OF STRUCTURE UNKNOWN

Ewing Walker said in HOLLAND'S MAGAZINE, "The great house was finished in 1857 . . . . . It is impossible to approximate the cost of the vast structure. John Andrews' slaves cut the cypress timbers from his own lands, baked the brick that went into the building, and performed the common labor . . . . . Slate and copper and marble were shipped in and skilled artisans imported . . . . . The great wings of this incredible house lie sodden and rotting. The stately Corinthian columns have been cruelly defaced by vandals. Little minds have guided irreverent hands in writing upon the faded, weather-stained walls. Thieves have carried away the marble mantels, and the marble of which the broad steps were made, and the silver knobs of the doors . . . . . Yet somehow, despite the havoc wrought by the elements and neglect and the vandals, a splendid dignity and stateliness linger about the old ruin."

Mr. Walker doubts if money, any amount of money, could restore the old order of things. "Perhaps, after all, it might be more fitting for it someday, in the majestic fury of a great flood, to find oblivion in the river—with old Glencoe and White Castle and Alhambra and the others of its day and kind."

But shall we stand idly by and let Old Man River, in majestic fury, sweep Belle Grove into oblivion? Shall we remain in quiescent mood and watch Father Time gradually crumble those magnificent walls into dust from whence they came?

SEE THIS HISTORIC PLACE

The object and intent of this appeal is to urge you to visit Belle Grove. And if, while there, you fall under the spell of its grandeur, sit down beneath those trailing banners of gray moss and take council with the giant liveoaks. They appear to be so very wise. They alone have kept faith with John Andrews and James Gallier. For nearly a century they have shaded the dream house and helped retain the tinted rose color that seems to have grown sweeter with age. And if you believe Belle Grove should be restored, do something about it.

The State Planning Commission has been negotiating with the owners of this property and have learned that the "finest plantation house in America", together with seventeen acres surrounding it, can be bought for $4,000.00. An architect has estimated that four thousand dollars wouldn't buy the brick that can be salvaged from the old structure. The State Planning Commission is also getting estimates on the cost of restoring the property to its former proportions, which will include the cost of rebuilding "de quarters" that can be used for organized group camping.

Some suggestions have been made as to how the restored property may be used. But again we urge you to visit Belle Grove and do something about it. Write a letter to any organization of which you are a member, in which you could say: "We have seen the government spend hundreds of thousands of dollars building places for recreation. How about using your efforts to get the state or the nation to buy and restore 'the finest plantation house in America'?"

LOUISIANA'S "DREAM HOUSE"

And when Belle Grove is restored to its former state of gaiety and beauty, we should have here a unique library—a large collection of books and manuscripts that were written prior to the Civil War. All furniture, paintings, and decorations should be representative of that period. This "dream house" will be the place for the anthropologist and the archaeologist, the rendezvous for students of history, literature and folklore of the Old South; it should continue to be the "dream house" for writers and artists and composers.

But we must not forget that Belle Grove was also a place for gaiety and outdoor sports. Horse racing and fox hunting, dancing and tournaments! A return to those sports wouldn't be a bad idea.

"The finest house in America" is near enough Louisiana State University for student group camping, for faculty group camping, and near enough Baton Rouge for church groups. It will attract and serve organized recreationalists from all over Louisiana, and after a few years will be self-sustaining.

FAMOUS HOUSE IS TO BE FURNISHED BY SOCIETIES

Patriotic societies are aiding the national conservation program through the preservation of historic sites, it is reported by the National Park Service. For example, Children of the American Revolution are planning to furnish a first-floor bedroom in the Moore House, at Colonial National Historical Park, Va. It was in this famous building that the terms of the surrender of Lord Cornwallis to General Washington were arranged. Daughters of the American Revolution furnished many of the items now on view in the Surrender Room, and the Daughters of the Cincinnati contributed generously to those of the dining room.

Two wooden blocks, original insulators used on the first telegraph line built across the United States 79 years ago, recently were added to the collection of historic relics in the Department of the Interior Museum in Washington. Discovered by officials of the Grazing Service at Fallon, Nev., the curios disclose that hand-wrought square nails were used to fasten the insulators to the telegraph poles.

Growth rate of yucca flower stalks measured at Sequoia National Park, Calif., indicates growths of from 7 to 11 inches within a 24-hour period.

The energy derived in the United States from coal, petroleum, and waterfalls is greater than would be available if every person had 40 human slaves to do his work.

The Professional Wildcrafters' Tribute To Louisiana

by
Raymond S. Spears

Professional wildcrafters, men, families, who make their livings by taking advantage of the prime-seasons for natural products, regard the State of Louisiana with admiration, affection and gratitude. There the legislature, courts and officials have given deep consideration for the interests of its citizens who need fur, wild meat, fish, native plant products and all the varied offerings of Nature to those who know and use them. Tens of thousands of men and women have floated down Old Mississip'—myself among them! —into N'Orleans or better yet, down Chaffelli—the beautiful Atchafalaya river, and found themselves in one of the most fascinating regions in our 3,026,000 square miles of National Domain, the continental area.

The work for Conservation performed by the State in Louisiana is an example which has been followed, now, by the Forest Service in its splendid statistical work in the Deep South—bringing to the neighboring states of Louisiana the need of wildlife, natural resource development, and the recognition of the enormous service which the state community of interests does when it makes the most of such commonplaces as fur mammals, feathered wild meat, game and non-game food animals, fish, buttonstock and freshwater pearls, wild nuts, wild fruits, berries, turtles, moss, native perfume stock.

Louisiana's land area is 45,409 square miles. It has produced in years of normal fur conditions (markets and supply) $100 a square mile. Compare this with the states where the rural population poisons off even the wild fur and wild hides that it has, yielding less than $3 a square mile as compared with potential $30 to $60 or so per square mile, which mere care-taking of the animals of valuable pelts would bring.

When I dropped down La Rompe one time, I stopped in with a fisherman, a big, husky, active man. He had a market garden in Maryland and he "owned" a stretch of water where he fished winters in Louisiana. The fish brought him $50 a week, average, during the "prime fishing". Then I saw 36 cases of fresh water terrapin at a landing, a shipment sent out by three wildcrafters, some $350 worth of wild products—three weeks work for three men in the still, clear shoal water pools, bayous, backwaters in the Red River Bottoms.

"Course, we take what the seasons offer!" one of the men said, "Take when the bullfrogs is singing, we c'n average $3, $5 snap-shootin' the jumbos with our 22-pistols. $15 to $25 or so a week, the prime season."

"Must make good shots of you?" I suggested.

"Wel-l, yes—Tolable! In fact," he smiled, "We kill our table meat with scabbard 22s—rabbits, squirrels, sometimes maybe a duck or even a goose. But we stick clost to our season-lines. You see, we put down some meat in the autumn—load in pecan and hickory nuts, along where they be. Comes winter, we got fur pockets. We save all the duck and goose feathers. Then we watch prime fur come, but soon as the guard-hairs rub, and the fur tips get dull, faded, we quit trapping. Come the fish migrate up, we run out jump-lines, fishing the reefs, and we have six-seven hoopnets. In the summer, there's herbs, roots—if you just take things when they're prime, you make good wages all the time. It's foolish to trap fur, mink, otter, muskrats, 'coons, 'Possums when they are blue and after they fade. Good quality brings two-three times moren't pretty good."

"How many lines do you follow?"

"We crowd in seven-eight lines," he answered, "Sometimes we find a good bed of button-mussels, and ship maybe a carload. It all depends. You know, wildgrapes make the best jelly and sweet grape juice in the world? We live good—knowing a lot of diff'rent lines. So do plenty others, too, when they're a mind to work. Trouble is some fellers try to live fifty-two weeks on six weeks prime fur trapping. Take professional wildcrafters and if they work six days a week, knowing what they're about—not just playing and running around—you'd be surprised how well they live, how much money they can put in the bank. They aren't shiftless."

Editor's Note—Herewith is an unsolicited tribute to conservation work in Louisiana by a citizen of another great State—California.

Raymond S. Spears, the author of this article, is President of the American Trappers' Association, and is a member of a staff of experts of a Bureau of Information conducted by Adventure Magazine.

Mr. Spears states that the Louisiana Conservation Review enables him to keep up with the information needed to supply answers to countless questions asked him by readers of Adventure Magazine.

WILDCRAFT LINES PROVIDE GOOD PROFITS FOR MANY PEOPLE

Louisiana trading centers learned, long ago, that they ought to take in from $100 to $200 a square mile of the wild area where they draw patronage. Those little stores back in the Brakes, where bayous fork and little lakes have their inlets, built high on piles to be above high water, know how much money comes in for furs, frogs, fish, moss, buttonshells, turtles, and all the other "natural resource" income producers. Thus if a commissary has the trade from fifty square miles, and can hold half the business, the figure is $10,000 gross and $5,000 net. And this means $1,000 to $2,000 profit for the trader's family to live on, from the wildcraft lines. Then, of course, there are the domestic occupations, goats, beef, cotton, ribbon cane—who ever forgets ribbon cane molasses?

In one of the western states they have thousands of square miles of reed (tuille) marshes. They feed a sheep off six acres, four upland and two marsh. The sheep brings any where from $1.92 up to $10 or so—and it costs $8.32 to raise. The two acres of marsh grows ten to twenty-five muskrats per—twenty to fifty rats. Just let the muskrats grow—and they'd bring in $1.20 per, say—or $12 to $30 per acre. And there are millions of acres of plateau and mountain wilderness where nobody ever raised a profitable sheep, cow or horse—yet that land would grow $25 to $100 a square mile in wild meat, furs, hides, by-lines of wildcrafting every year. It took right bright men in Louisiana to realize they had the most remarkable wild life and wildcrafting area any where.

Good fur grow in Louisiana? Why, that's away down south! What many don't realize is that Old Mississip' brings a lot of cold water down the reaches and bends, and scatters it out through the Louisiana Bottoms. The water is sure fresh and chilly! The deer swimming from island to island needs fat and thick hair to keep warm. The mink, otter, muskrats, raccoons, 'Possums, even the wildcats and panthers would sure chill if they tried to travel around with just hair, comes the winter freezing up the Ohio, Missouri, and Upper Missouri! So on the islands and in the brakes grow an enormous abundance of roots, grasses, browse and foodstuffs. There grow, in the water, sure healthy food for the fish and water animals—including birds. The wildlife has need of warm jackets—and so Louisiana fur is as good as the prime-fur belt from the Ozarks to the Blue Ridge and the Pennsylvania Alleghanies. The wildlife has ten times as much food—because in the north snow makes a month to three months Hungry Moons, unknown in Louisiana.

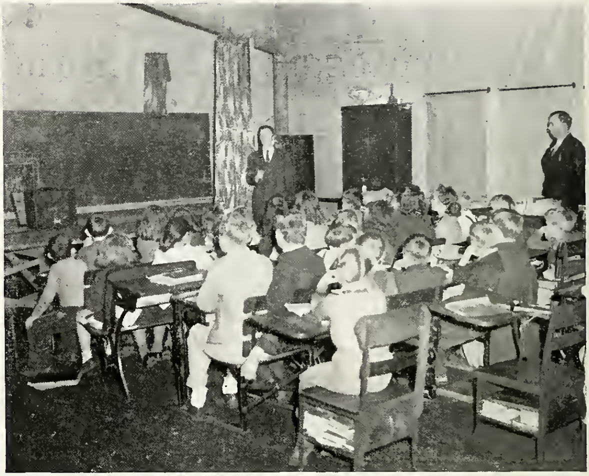
Sometimes trippers coming down from the Upper Mississippi Basin find fault about the protection given wildlife in Louisiana, and to the professional wildcrafters in Louisiana. A great man, several great men, saw that to protect Louisiana fur capital stock, and the citizens of the state, the up-river men must be restrained. Those trappers and hunters from up the line overtrapped their own fur country and hunting country. They want to "hog in" on the thrifty state of Louisiana—and overdo wildcrafting there.

Since the 1880s, Maine, and since about 1910, New York and Pennsylvania have practiced conservation. New York went from an annual fur-take of $75,000 a season to $2,800,000 in 1927-28, with more than a million a year average since 1920. Pennsylvania gets perhaps $1,500,000 a year from its fur seasons. Between them they have now a fur supply to take care of ten or twelve thousand families during the hard winter months.

Lots of people never realized that the Middle Western states, over more than half their area, lived all winter on wildlife until fur, fish, game were gone. Then the "marginal land areas" starved the families out—as in Oklahoma, Kansas, Michigan, Minnesota, the Dakotas—because domestic occupations gave the families only six months living in summer, and wildlife used to give the winter livings, till the parent stock, the forests and other cover, the migratory birds were killed off. They couldn't get rid of the fur fast enough so they poisoned it off, the year around, because the wolves were supposed to kill stock, and badgers to make holes in the ground. As a matter of fact, poisoning the gophers, prairie dogs, cottontails and other burrowing animals kills off the bunch grass in the high country. The burrowers make mounds. In the mounds are grass seeds, fertilized, mulched and root-food. Thus poisoning off the burrowers really destroys the little gardeners, the grass-growers of the upland pastures. But the farmers and stock men don't know that that wildlife grows their pasture grass.

CONSERVATION PROGRAM FAR ADVANCED IN LOUISIANA

In Louisiana Conservation is taught in the schools. In the western states (1,250,000 square miles of the national domain) Conservation is a joke, a nuisance—and this costs the Western States an inestimable income. But there are signs that the enlightened men of Louisiana who put Conservation into every school in their state are coming into their own. They really saved for Louisiana the livings of all the people in the "marginal lands" by enabling them to piece out their domestic occupation incomes with wildlife



■ **Conservation is taught in the schools of Louisiana. In the above photo, Ambrose Daigre, member of the educational staff of the Department of Conservation, is shown lecturing to a class at the Pearl River School.**

■ **Typical muskrat house on the Cameron Parish marshlands where some of the finest pelts are taken each winter.**

and natural resource incomes; they set the example for every Department of Education in the United States—and educators in Missouri, New York, Pennsylvania, and in other states where intelligence of the kind is found are profiting by the example of Louisiana's Department of Conservation. Professional wildcrafters sing Louisiana's praise.

The discovery of the enormous economic importance of wildlife, the fact of hundreds of thousands of families in need of wild meat, fur income and sideline products from the migratory birds, the fur animals and the food-stuff animals eaten by the predatory fur bearers, is coming home to the legislators of some of those states who have wasted, neglected and abused the creatures. The marginal land occupants in the wild land regions have been largely starved out. One of the most pathetic of mentions in the novel, "Grapes of Wrath," is the remark that the starved family had only a rabbit to eat. In that land there should have been hundreds weight of wild meat for each family during the lean winter months.

Louisiana is beautiful wilderness, and profitable. On the long ridges and along the river banks are beautiful plantations. Of its 45,409 square miles, how much is cultivated land, under domestic occupation? Consider the National facts.

2,000,000 square miles—Wilderness.

500,000 square miles—Marginal Land.

500,000 square miles—Domestic occupations.

3,026,000—Total area.

Louisiana is using its Wild Lands, caring for thousands of families merely by keeping fur, fish, wild meat, frogs, turtles, and other valuable wild life producing—millions of dollars value yearly. If the other States had been as thrifty, the Annual fur production in the United States would have been none can tell how much more valuable than now. The area available for wildlife production is 2,000,000 square miles. Louisiana did not waste its wildlife, nor the people depending on wildlife for so many months of their living, annually.

STATE THRIFT COMES FROM IDEALISTS WHO WORK

If Louisiana would just consider the number of families who live on natural products, it will find how many are living well, happily, and in good condition—and take away the wild life—in imagination! —and it will see how great a burden the state has escaped because of its Conservation Commission. And the states whose citizens have been starved off some of the finest wildlife potential areas of production may well look to their own opportunities for letting the Wilderness care for its trappers, hunters, professional wildcrafters, Nature lovers. Conservation is thrift.

State thrift doesn't just happen. It comes of idealists, men who see what should be done, and then do it! Handsful of inspired citizens have ever been the glory of our country—and I wish to pay tribute to the men in Louisiana who gave that state Conservation. They don't need any one's praise, of course. In their hearts they know their work—but they do not know the tenth of what they have done for people who never heard of them, who take for granted the wildlife upon which they live in prime seasons, whose tables include wild food products, from season to season, because in far Louisiana during many years and much toil were revealed the fruits of the vast wild pastures, gardens, coverts, good fishing pools and eddies. Because they loved the glories of Nature, patient, persistent, inspired men did what they could to be helpful to the creatures and the wilds.

". . . Louisiana is beautiful wilderness and profitable". . . Above a typical swamp scene in the state.

In the beginning they could not have known they were laying up great riches for their people in the dire need to come. How many thousands of families are eating now in Louisiana of the bounty of Nature who would have been dependent on the State, the taxpayers, the credit of the government if the handful of Conservationists had not been doing so much better than even they, themselves knew? Figure the Relief bill Louisiana might had had!

Across the Nation, from ocean to ocean, and far above and below the national boundaries the example of Louisiana is urged upon all the wildlife departments, state and Federal, because there is such a conspicuous example of financial values, of unmistakable, undeniable profits. The practical citizen, even, can see that Conservation has paid, enormously. Because a handful of men—count them! —spent years of time, effort, study, lives, they benefited, literally, millions of hunters, wildcrafters, marginal land dwellers. Whatever the sacrifice, toil and costs, Louisiana has given the Nation a yardstick with which to measure the material and the spiritual—intellectual—returns in sentimental, scientific, social, sport, recreational intangibles.

Every rural school in the land, every educational institution where youthful need and curiosity exists, should have its Conservation Courses. Of the National continental domain, 2,500,000 square miles of the three million square miles, needs the direct uplift of Conservation work. In the arid regions, it has been shown that six or seven families of dam-building beavers return upwards of $100,000 annually by water conservation and related developments—making more than 20,000 acres of pasture where none was available for beef growing except for beaver reservoirs. Thus from the high, dry plateaus to the Gulf Coast Swamps, regional Conservation development—an end to wasted wildlife—is required.

■ Close-up of the native Louisiana Beaver, showing texture of fur. The Beaver, is an example of how Louisiana protects its animal life through wise conservation. There has been a closed season on beaver for more than twenty years.

Following Louisiana's example, it is obvious—now!—that hundreds of thousands of families in the marginal land areas could be supported during weeks, months, and even the full year by wildlife. How important this is to the seasonal workers is a matter of record. The itinerant labor is indispensable during certain months in certain areas. In off seasons, the Okies who pick fruit would catch fish, take fur, shoot wild meat, and become self-supporting through wild products the year around, instead of during three to six months. The national wild fur, alone, say, would yield an income of more than $200,000,000 paid to wildcrafters for the skins—instead of, say, less than $18,000,000 a year, now. And industry would increase proportionately.

■ The opossum, next to the muskrat, is the most abundant fur-bearer in Louisiana, over a quarter of a million pelts being taken annually.

Probably 20,000,000 bushels of wild grapes go to waste, down the Mississippi, annually—enough to make 20,000,000 gallons of jelly and twice as much wild grape sweet-juice of the most delicious flavor. Wild honey pays all the taxes on one 20,000 acres or so of "desert" lands, being harvested every five years. Restoration of wildlife on the lower Mississippi would bring a hundred thousand tourists down the river and bayous and tributaries—spending $10,000,000 to $20,000,000 in the "Swamps".

It would pay the wildlife departments of all the Lower River Bottom States to get together on this matter of the development of natural wildlife and wild products resources available and to be developed utilizing the so-called "waste" lands of the Swamps. Lands now idle would thus be made to produce from $100 to $300 per square mile of "new" money, or rather in the equivalents in everything from hickory nuts to feathers, from wild honey to perfume, from furs to fish, meat, livings and pleasure.

The Trend of Modern Fish Culture

As Exemplifed by Louisiana's New Fish Restoration Policy

by

Percy Viosca, Jr.

As is the case in other states of the Union, fish culture practices in Louisiana have undergone a considerable evolution. During the early days, fish from other regions were imported and planted throughout the state, but, as we have later learned, only to disappear, perhaps after serving as tempting morsels for our more voracious native species. Then came a period of uncertain development, during which attempts were made to copy methods developed in other climes. During this period, however, many approved hatchery practices were developed. Even after local innovations were applied, however, the results proved to be of little or no practical value in terms of fish taken by anglers. There was also the pork barrel stage of fish culture during which fish were planted in proportion to political pressure, but these were native fish, and some at least had a chance of survival.

■ Beechwood Fish hatchery lies 15 miles southwest of Alexandria, on a reservation of 320 acres surrounded by 2200 additional acres of forest and game preserves. This is one of several of state owned and operated fish hatcheries in Louisiana.

■ Concrete Dam on Indian Creek near Forest Hill. This dam furnishes a gravity water supply of spring water to the Beechwood Fish Hatchery.

Biologists as well as the general public are at last coming to appreciate that a modern fish culturist must of necessity be a "streamologist" as well. After a study of natural waters of this state, some very surprising and important facts have come to light. There were, for example, the discoveries that both the smallmouth bass and the rock bass of southern streams were quite different from the corresponding northern species. The southern smallmouth bass, found only in our swifter streams, is perhaps the most voracious fresh water game fish in this state. It's chief associates are the long-eared sunfish and the southern rock bass, species which have never been reared at any of our hatcheries. Young of the largemouth bass and of the sunfishes of more sluggish waters cannot exist after breakfast time in the same waters as this smallmouth. It can readily be seen that the older school of fish culturists had been feeding to the native smallmouths, the various and sundry fry and fingerlings of the species reared in our hatcheries. This did not mar the record, however, because the fry were counted only before the feast.

We are learning that many factors may cause the practical results of a fish culture policy to be quite different from the

[Turn to Page 52]

Community Work A State Objective

by
Mary Mims

Mary Mims

Do I believe in Community Work? *Definitely I do!* Or I should not have given the glorious part of my life to its initiation and development as a *confining, conserving,* yet *vigorous* help in promoting good citizenship. *Confining*—since it curbs the restless spirit and diverts it to an appreciation of what the Community possesses by inheritance or by its own exertion; *conserving*—for with appreciation comes the desire to preserve and conserve its values and direct them to their highest and most needed uses; and *vigorous*—since possession feeds the stalwart in man, giving him the feeling of being a lord-of-creation which the mere job holder cannot even sense. The payment of worthy taxes on justly accumulated property makes him realize that he is a support of the wonderful government that history tells him his forefathers built by "blood, brawn and tears," and bequeathed to him to strengthen and modify to suit his time's demand.

Conserving the Community life is the greatest need in a Conservation Program. When the spirit of the Community is awakened, land, forests, minerals, game, flowers, homes, schools and churches will not only be conserved, but developed and enjoyed.

The Town and Rural Communities are as important—possibly more important—to civilization as the Urban Community. The creation of a creative, cooperative, upright and happy civilization is the *challenge of the present!* Genuine happiness in a Community comes from understanding. Each Community has many organizations and agencies working. These organizations and agencies run in parallel lines, not realizing that parallel lines *never* meet; it is Community Work which unites them into one working whole. The Community Coordinating Council is composed of representatives from each organization and agency. This Council meets and plans the Community Objectives to be presented to the entire Community for discussion and acceptance, or revision. Our specialized knowledge is of little service until it becomes humanized; it becomes humanized by and in the Community itself.

PROBLEMS CAN BE TURNED INTO OPPORTUNITIES

Community Work touches every quality belonging to a rural American citizenship. It makes every inhabitant of the Community a member, for, if he lives in the Community, he is a member of that Community even though he never realized it before. When the knowledge comes to him that he is a member of the Community and thus responsible to it in more ways than by just owning a few or many acres of ground unmolested, he opens his eyes; he turns the searchlight within, and finds *opportunities,* which before had been labeled *problems.*

Editor's note—Mary Mims, Extension Sociologist of the Louisiana State University is known throughout Louisiana for her work among rural people. She is the originator of the Folk School movement in Louisiana and is constantly preaching the benefits of conservation and community work.

Conserving the soil, flood control, reforestation, diversification of crops, better livestock, a sufficient food and feed program, knowing and obeying the game and fish laws—all laws—, cooperative production and distribution, roads and highways, farm organization working with civic organizations, sane health programs, rural electricity, libraries, attractive architecture, home and Community planning and planting, forums, bands, orchestras, dramatics, singing, playgrounds and parks in each Community working in coordination with State and Federal Parks, schools and churches becoming *living* Community inspirations, are some of the *problems* which are and can become *opportunities!*

In many parishes the year's work culminates in a Parish Folk School. The organized Communities choose topics each month for study and discussion. These topics deal with State, national and international problems. If ever there was a time for us—especially our Youth—to realize what it is to be a member of a Democracy, it is today. Citizenship is the aim of a Democracy, *responsible citizenship,* and, vice versa, a Democracy is the aim of an intelligent, independent, individualistic citizenship. We need to think with intelligence rather than prejudice.

COMMUNITY LIFE IS THE GROUND FLOOR OF OUR NATIONAL LIFE

Our soils may erode, our forests may be slaughtered, but the undaunted courage, the hardihood of character which were used in establishing our first Communities—the thirteen Colonies—must be our possession today. Honor, truth, righteousness cannot erode, neither can these characteristics be slaughtered. The agony of the old world today reaches us through the cries of the shackled millions who had a glimpse and a taste of what freedom means, then, not prepared, slipped back into a thraldom more cruel, more crushing, more demoniacal than any that forms their background. Yet for one resplendent moment the world reached its growth and was enabled to visualize the tolerance and charity necessary to regulate its affairs by arbitration. In order to secure this vision and establish a fact, our Communities even sent their Youth to plow the furrows and water them with their blood, and "Over There" drop the seed meant to "Make the World Safe for Democracy." What can we do about it now that we have begun to think in terms of the world except organize Community after Community until they form the connected ground floor of our National life. From them comes the food for our Camps, our factories, our ships, for life in City and in Country. From them come our hardy laborers, our brilliant engineers, our skillful carpenters, our capable nurses and doctors,—thinkers and artisans of all kinds—in one vast army which makes the totalitarian aggressor catch his breath, *stop, look and listen!* Our Government fears no dissention, no strikes, no wrong at all, from Communities living their best, which organized Communities insure, but it rests solidly and firmly in its realizaton that the Communities represent the perfect in our Motto, "E Pluribus Unum."

The Spirit of Democracy flows through the Communities like the vital fluid flowing through the human body, transforming it into glorious activity, unparalleled beauty, and, standing the King of the World, the only aspirant to Eternity. So, I believe that through the Communities flows the vital fluid that permeates national life and flowers in our marvelous Federal Government, now standing a model to self-destroying, perishing civilizations.

Yes, I believe in Community Work.

Bobwhite investigations, conducted recently by a government wildlife bureau, revealed the nutritive value and palatability of several native quail foods. It was developed during the study that common salt is a valuable aid in combating cannibalism among both growing and adult birds

Do your part in helping to prevent forest fires. They do considerable damage. Most forest fires are caused through carelessness and can be avoided. Do your part.

If you have any good photographs on any wildlife subject, we would like to publish them in the Review. Send them to us.

Protect Game and Fish. Wise Conservation pays.

■ Some typical examples of community work in Louisiana. (1) Union Hall's Community House in Red River Parish, built by community labor, completed in 1939. It is now painted. (2) A pre-school clinic at a Folk School. Children are given free examinations. (3) A typical Folk School class. (4) A Community Garden, proceeds went toward building a church. (5) Comunity House, in Shady Grove, Beauregard Parish, built entirely by the community.

Beautification of Highways Is Major Louisiana Project

Three important State Departments and several statewide civic organizations have joined together in a major project of roadsides improvement. The purpose of the program is to see that highway roadsides are cleaned up and beautified.

The Louisiana Garden Club Federation, with a membership of several thousand women in all parts of the State, have undertaken a program to preserve the natural beauty of Louisiana roadsides and to rehabilitate them where they have been spoiled.

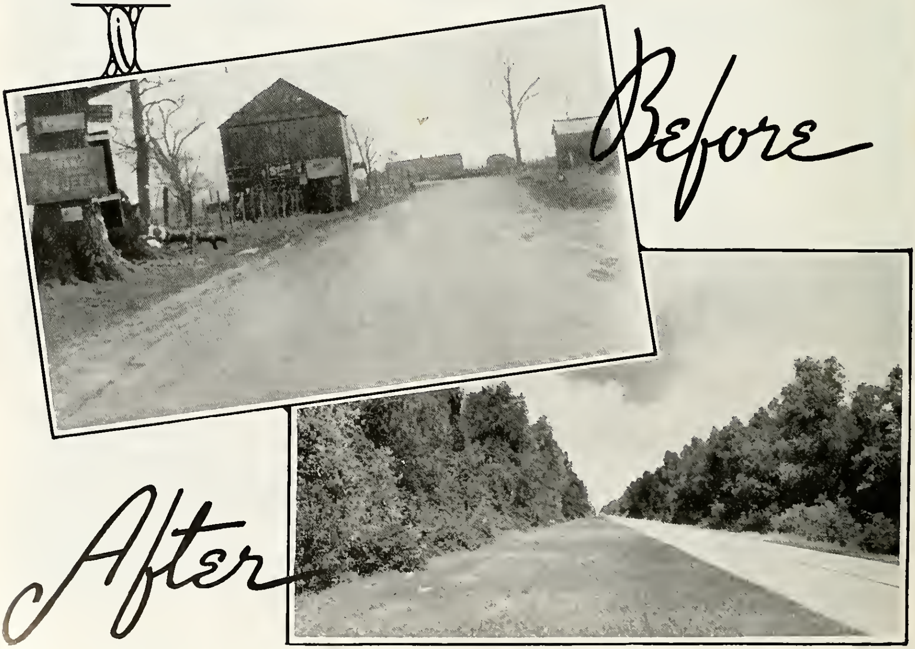
The Department of Highways of which Prescott Foster is Director has undertaken a far-reaching highway beautification program. In charge of this project for the Department of Highways will be Miss Caroline Dormon of Saline, who was recently appointed highway beautification consultant.

Statewide Program

Miss Dormon will co-operate with all organizations interested in making Louisiana roadsides more attractive, particularly in preserving and protecting the native trees and shrubs on and adjacent to the highways of the state. Miss Dormon has been identified with the conservation movement in the South since its inception, and was employed for several years in the forestry division of the Department of Conservation. She has given numerous lectures in Louisiana and other Southern states.

Many garden clubs and civic organizations are much interested in the development of attractive roadsides and can accomplish much valuable work if this work is designed and performed in accordance with Department of Highways long range plans and standards for the safety and convenience of highway traffic. One of Miss Dormon's tasks will be to co-ordinate the efforts of the various independent organizations in the state.

[Turn to Page 39]



■ Many Louisiana roadsides now look like the one pictured in the photograph to the left, above, and it is the purpose of the highway beautification program now under way to get them cleaned up and looking as attractive and clean as the roadside pictured on the right.

SAVE, OH, SAVE!

by
Caroline Dormon

(Photographs by the author.)

Blossom-time will soon be here again—and what so lovely as our own Louisiana woods? Alas, however, with flowers, come the flower-pickers. Flower-breakers would be more nearly correct, as some thoughtless ones tear down great branches of blooming dogwood, and practically destroy entire plants of wild azalea.

In private grounds, nearly everyone now has a "cutting garden", thus sparing the plants grown for display. If only these guardians of their own flowers could be made to feel that the roadside is simply our big frontyard! Then they would pause, and reaching fingers be withdrawn.

Nature has been so lavish with her beauty here in Louisiana. Every month in the entire year some flower may be found in our woodlands. Even in January, "tag alder" hangs out her graceful yellow catkins. By the way, this is one flower which may be cut freely, as alder is a rapid grower, and is quite common in the hills. The sprays are quite lovely in a blue vase or bowl.

■ Nothing can surpass the beauty of our wild pink azalea, massed by every stream in the hills.

By the last of February a glow of truly royal color begins to creep into the greys and browns of winter—the beloved redbud. It is indeed difficult to understand how anyone could have the heart to mutilate this tree, which verily braves the snow and sleet; but look at some of the once fine specimens near our highways. Offering a dainty foil for the brilliant redbud, wild plum fills the woods with misty white. And at the same time yellow jessamine vine starts hanging out her fragrant golden bells. This vine grows rapidly, and is not damaged by the cutting of sprays, if they are clipped with care. Serviceberry, a small tree which blooms at this time is in need of protection, as it is rare in this state. It becomes a mass of delicate drooping white flowers.

The author of Louisiana Wild Flowers, Forest Trees of Louisiana, and numerous magazine articles on similar subjects, is an expert on flowers and highway beautification, and in this article, Miss Caroline Dormon describes the flowers and shrubs that grow in Louisiana and makes an appeal for their protection.

Miss Dormon has recently become associated with the Louisiana Department of Highways as Highway Beautification Consultant.

SPRING BRINGS WITH IT PEAK OF EXQUISITE BEAUTY

But in March and April Louisiana woods really reach a peak in exquisite beauty. Dogwood whitens the hillsides, while every stream bank and low ground becomes a mass of dainty pink, the wild azalea. Grand-sir-greybeard puts on his fringe, and masses of lovely crabapple sweeten the air, while the ground beneath is clothed in bright blue and lavender violets, wild phlox, and verbena. If one will take along a pair of garden shears and clip verbena and phlox with care, no harm will be done—but often they are ruthlessly torn up by the roots. However, it is really useless to try to carry home any wild flower, unless one has been so thoughtful as to carry along a jug of water.

■ Physostegia digitalis, a lovely wild perennial.

April and May bring in wild hydrangea, with its great showy heads of creamy bloom; and the several viburnums, with their panacles of tiny flowers. The latter are followed by beautiful blue berries in the fall.

In April our own gorgeous Louisiana iris make their finest display. This is one of the few flowers which is exclusively our own, and should be a banner flung out for all to see along our roadsides. If planted along bayous, ponds, and lagoons, and protected from those who dig to commercialize it, it would soon brighten many a dreary stretch of highway.

May and June bring such a wealth of wild flowers among the herbaceous perennials that only a few can be named here. Few persons seem to know that

■ **Wild white pentstemon may be picked freely.**

we have beautiful native orchids, many species, in many forms and colors. Except one, all of our species grow in the soil—usually in bogs—but oh, so lightly anchored! The flowers are beautiful, but when the picker grasps the slender stem the entire root comes up with it. Thus not only are the seed lost, but the plant destroyed. The exquisite fringed orchids, both orange and white, and calopogon, with large lavender flowers, (all bog orchids) are almost gone. The showy yellow ladyslipper, which grows on shady slopes, is all but extinct in the state.

The odd and attractive flowers of pitcher-plants also appear at this season, and they may be cut without damage to the plant. Other blooms which may be cut without harm are such deep-growing perennials as scarlet butterflyweed (milkweed family, numerous seeds), and Jersey tea.

In June and July we have a dainty iris-cousin in great need of protection, lovely eustylis. From its tiny bulbous root it sends up several grass-like blades, then a slender stem topped by an orchid-like flower, purple, tan, and gold. The blossom is three-petaled, about two inches across. Needless to state, forest fires which sweep the hill country destroy many fine species of wild flowers. Also, much harm is done by browsing herds of cows and goats.

FLOWER PICKERS CAN BE MOST CAREFREE IN EARLY AUTUMN

It is safe to cut the flowers of the several colorful physostegias, for they reproduce freely from seed, and are also perennial. The pentstemons, too, may be cut without a twinge of conscience. Rudbeckias may be carried home to supply colorful bouquets, as they produce seeds in vast quantities. By studying the summer flowers, it is easy to see which one should be spared.

In August and September the flower-picker can really be almost carefree, for then the members of the composite family take the day. To this family belong the beloved goldenrod, ironweed, and mistflower. All are perennials, common everywhere, and free seeders. All the white eupatoriums, too, come in this class. But even in this lavish time, one flower pleads for protection—the vivid cardinal flower. It produces thousands of seeds, but they (like those of the orchids) are fine as dust, and few reach maturity.

When fall really arrives, wild sunflowers, with their small flowers borne in masses on long graceful stems, offer armfuls of gold to those who wish to carry them home. They grow in sheets in every bit of low ground, and surely no amount of gathering could decimate them to any alarming degree. The same is true of our various lovely wild asters.

But with late October and November come two darlings of the wild which need to be guarded jealously. Everyone loves the rare deep blue of closed gentian—but let's *love and leave.* Not only has it been destroyed for its lovely flower, but it is dug by herb gatherers, as the root possesses medicinal value. And in the depths of undisturbed pine woods (seldom found now) the fragrant Indian pipe springs from the ground like a white spirit. It is a saprophyte (*not* a fungus), growing in decaying vegetable matter, and when picked does not come again. It is disappearing at an alarming rate.

■ **Dogwood, which is being destroyed along every roadside.**

■ **Wild azalea, one of our native shrubs, is in dire need of protection.**

HELP ENFORCE THE LAW AGAINST CUTTING WILD FLOWERS

Even December gives us one flower, the sweet yellow fringe of witch hazel. This shrub is quite common in the hills, and grows rapidly, so no harm can be done by stealing a spray here and there . . . if one will carry shears, and cut as if in one's own garden.

It is a simple matter to teach children which flowers should be picked and which spared, and they love to feel that they are helping to guard Nature's treasures.

And what of the grownups? Oh, surely we can limit *our* wants to the things we may rightfully have! So often we want to dig up a beautiful blooming plant by the roadside, without stopping to think whether or not it will grow when carried home. It is merely a matter of perspective, or perhaps, horizons. If we think of the whole state as a garden belonging to each of us, then the desire to protect it becomes strong within us. We have an excellent state law, forbidding the cutting or digging of trees and wild flowers, and every flower lover should become a committee of one to help bring about the enforcement of this law. Much has already been lost; let us hold fast to what is left to us.

Bread and Gumbo

BY CATHERINE B. DILLON[*]

One June day in 1936 a young man in Catahoula Parish, while emptying a bucket of silt from a freshly dug well, noticed something sparkling in the sunlight. When panned in a wash basin, the dirt yielded one teaspoonful of gold. From time to time, similar tales have come out of the Catahoula hills, yet very little attention is paid to them. Many of those who would ordinarily heed the call to a gold rush are too pre-occupied wresting their living from Mother Nature through less difficult methods. Hard-panning for gold holds little or no attraction for the Louisianians who eke out an existence through the various means afforded by the State's abundant wildlife. Fishermen, trappers, shanty boat and batture dwellers, lumberjacks, oil, cane and cotton field workers, rarely need to seek work in between jobs. One season comes so quickly upon the heels of another that there is often little time for the extra wildcrafts and swamp business that serve to fill in during unemployment periods.

The great fields of endeavor providing income through Louisiana's natural resources—trapping, fishing, mine, field and forest work are all too extensive in their scope to be treated in a single article, but many interesting lesser phases can be covered. Those who earn their living through these means often change from one type of work to another during a single season. Sometimes the same man serves as a fisherman, trapper, moss gatherer, cuts a little cane or picks cotton, does a bit of canning and helps the engineers to keep Father Mississippi in harness, all in the same year. In his spare time, if he still has any, he catches frogs, alligators and turtles, makes *latanier* articles, digs for wild roots, and serves as an expert fishing and hunting guide to visiting sportsmen.

Game in season supplies the swamp-dweller's family with food fit for kings. Rabbit hunting adds to his pocketbook. At the village store many of his wares are swapped for bacon, flour, and canned goods—especially the tinned sardines that fishermen take along on trips. However, much of the food for his table comes from the nearby woods and bayous and a little back yard garden wherever such is possible.

TRAPPERS NEVER SET THEIR FIRST TRAP ON FRIDAY

Louisiana's fur-bearing animals provide comfort for more than milady who dons the coats and scarves produced through the trapping industry. Trap setting is one way of keeping the wolf from the swampfolks' door—literally and figuratively. When the season officially opens, the trapper sets his first trap—unless the first day is Friday then he waits until the second day, because the first trap of the season must never be set on Friday. If he happens to put his clothes on wrong side out they stay that way for luck. He saves the bodies of non-edible animals for fertilizer for the orange groves, but when breaking camp, the broom and the cat are never taken home.

Fishing offers many ways of earning money aside from going down to the Gulf in sloops and luggers after deep water species. Louisiana's blue-shell crab alone runs into a half million dollar business annually—giving, along with its crabmeat packing canneries, employment to over six hundred persons. Crabs are caught in both lakes and rivers. Lines are strung from wharves especially built under the moss-draped oaks along the bayou banks, jutting out just far enough to make crab-catching practicable. Stew meat and the skins of non-saleable animals cut into strips serve as bait. The first crab is always thrown back into the water for luck. Hard shell crabs are sold to markets, restaurants and canning factories.

In the last decade, the soft-shell crab has assumed great importance. At one time, when men had to seek for them in their hideouts, soft crabs were a high-priced luxury within the reach of only those whose pocketbooks could afford expensive food. Today, this delicacy is available to everyone and is shipped throughout the Nation. The discovery of an easy catching method brought about this change. Bayou people have long caught tiny bait shrimp by sinking leafy boughs of wild cherry, live oak and wax myrtle into the streams. When the branches are lifted shrimp fall out from among the leaves into a net prepared to receive them. This is called bush-fishing.

In 1931, two Barataria wives left their shrimp boughs down longer than usual. When the leaves were shaken, several dozen soft-shell crabs fell out with the shrimp. The unsuspecting crustaceans had sought shelter among the branches, only to find themselves carried off to the nearest store to be eventually fried and eaten. Natives now go bush-fishing for soft crabs.

SOFT-SHELL CRABS APLENTY IN BARATARIA SECTION

Monthly for the first fourteen months of his lifetime, the blue crab sheds his shell. He is a game fighter in his stiff armor, but under his soft coat, his resistance is pretty low. When he feels that he is going soft, he hides to avoid his enemies. For hard and soft crabs do not mix. The former will devour the latter. In looking for a place of protection, the shedding crab crawls into the submerged boughs where his strongest foe conquers him. If caught just before he sheds, and the shell is removed by hand, the crab, known as a buster, is even more delicious than when shedding is natural. Many vendors of soft crabs use this process. "Me, I don' wait for heem to shed", says one Bayou St. John crabwoman, "I peel heem myself." The soft crab industry enables hundreds to provide their necessities and shun charity. Today, buyers go down to Barataria where there is a crab exchange. Soft-shell crabs like warm weather. During the season, which usually begins with the early spring, around March 1st, and lasts until the first cold days of winter, Barataria could supply over a thousand soft-shell crabs daily, if enough bush-fishers were available. But, if everybody caught soft crabs, who then would catch the early crayfish?

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[*] From material supplied by the Louisiana Writers' Project, Works Projects Administration.

Marsh people fish in spring and summer, trap in fall and winter, gather moss almost constantly, but at sometime in spring, everyone's thoughts turn to the miniature lobsters that provide the famous crayfish bisque served in the restaurants of old New Orleans. Ditches along the highways abound with "mud bugs", as the natives call them. It takes little effort to catch them. A few yards of string, some sticks and salt meat bait will do the work. Just spit on the bait, remain perfectly quiet, and know just when to pull up the line. It is that simple!

THE CRAYFISH CAN TAKE CARE OF HIMSELF WITHOUT AID

There is no closed season, for conservation laws made to protect during mating, are not needed where the crayfish is concerned—he can take care of himself and his family without the aid of the law. During summer crayfishes are so far under ground that no earthly man can disturb them. Their eggs are hatched in the fall. Crayfish come in several colors. The rare sand crayfish, known as Diogenes, is yellow and maroon. He stays down in a little pool of water at the bottom of his hole, to which he has dug an in-going and out-going tunnel. The spring water crayfish is chocolate brown; the clay, light blue, the river crayfish is white, and the most common Louisiana type is the red swamp crayfish from which an ancient Louisiana Indian tribe—the *Shakchi humma okla* (Red crayfish men) —received its name.

One must get up early in the morning to catch the wary crayfish. He comes out of his hole at night to eat—being especially fond of mosquito eggs. The wee hours find the marsh and swamp people stirring into their clothes, gulping strong coffee, and with bait, sacks and net poles, they are off to catch the mud bugs. Bringing home their day's catch in skiffs or pirogues through ditches that run to their own back doors, many of the fishermen sell their crayfish to the markets at three to four cents per pound. Others peddle them along the highways, averaging $1.50 to $3.00 daily, with sometimes $10.00 or $12.00 on a good Sunday. To attract motorists, children stand out in the road wiggling live crayfish or holding dead ones aloft on poles. Boiled crayfish are also sold by road vendors and at eating places along the lakefront.

■ Louisiana crayfish provide a living for many. Fishermen sell them to the markets for three to four cents per pound.

There are thousands of families in Louisiana nobody ever hears about engaged in minor occupations, who make their own livings from the natural resources of the state, and ask no odds or relief from any one.

In this article, Miss Catherine B. Dillon, a member of the staff of the Louisiana Writers' Project of the Works Projects Administration, tells about these people who earn their living from the state's natural resources.

We are sure you will learn about many unusual customs and occupations of native Louisianians by reading this most interesting article.

SHRIMP SEASON PROVIDES WORK FOR THOUSANDS

Besides the money derived from them as a food product, oysters and mussels offer several ways of getting the daily bread Bedding and re-bedding entails considerable work even before the oyster is marketable. Opening and canning give employment to many. Even the shells are converted into practical use. They are conserved for road building purposes. Many fishermen make their homes on small islands built of oyster shells. A few bivalves are decorated. Clusters of three or four pearly lined shells, adorned with roses, forget-me-nots, violets or crudely painted landscapes, are sold as souvenirs.

The shrimping season—late-summer—is a gay one. The Blessing of the Shrimp Fleet begins a round of coming in and going out that carries on from August through October. In September, canning begins. For truckers and pickers work is plentiful, but girls, who make the best pickers because their hands are more deft, are in demand. This gives the men more time on the water. No one under sixteen is allowed to work in the factories, where peeling shrimp is piecework. For every twelve pounds of shells, the picker gets about ten cents. Shrimp are also dried for commercial purposes on great sun-drying platforms by a process introduced to Louisiana in the early part of this century by Chinese merchants. River shrimp, considered a choice delicacy, are sold mainly to restaurants.

The lowly catfish may appear as anything on a menu, but when caught along the banks of the Great Father of Waters, it is nothing short of gold. Persons who have been stringing their lines along the river's edge for more than a quarter of a century have unshakable faith in the ability of the catfish to provide a livelihood for their families. Strung along the water, galvanized wire, from which dangle shrimp or banana bait on fish hooks, serves for lines. The bait lures the catfish; the fish lures the money. There is no middle man in the catfish industry. It is sold directly to the consumer. Some of the levee people swap their prizes at corner groceries for commodities, but most of the catfish caught go to small restaurants and negro fish fries. Twenty or thirty pound cats are sold by weight; smaller fishes by the bunch, averaging about six cents a pound. Catching catfish for fish fries is one of the negro's favorite forms of outdoor pleasure. With a line tied to his big toe, he can sleep undisturbed until a strong tug at his foot tells him a fish is biting. Running from spring to November, the catfish season coincides with fish fry time.

For many years, artificial flowers have been made from large fish scales. When tinted and shaped these are transformed into water lilies, roses and other popular blossoms for ornamental purposes. Garfish scales, resembling irregular bits of mother-of-pearl, have given rise to a new craft in Louisiana. These may not only be converted into flowers, but costume jewelry, wall decorations for framing, and other attractive articles. Gar scale souvenirs will probably afford the bayou people another way of getting extra tide-over cash.

HIGH WATER COMING WHEN "MALLARD DUCK" FROG CALLS

The frog business is a thriving one in modern Louisiana. Hatcheries for commercial propagation are operated on a large scale with State supervision, but trappers and fisherfolk still bring frogs in from the swamplands. Often farmers who plow all day long, go frog hunting by night. The swampdweller knows the call of every frog in the mire. Among the numerous distinct types, there is a whistling tree frog found in this State that is rarely found elsewhere. The Cajuns call it *la grenouille.* The bullfrog that emits a deep bass bellow, especially in summer, is known as the "warraron" from the sound of its cry. One Louisiana frog has a call like a mallard duck. Whenever this is heard at night, people along the streams look for high water.

Many states and foreign lands get Louisiana frogs. The African frog served in other sections is nothing more nor less than Creole *Rana Catesbiana.* Frogs multiply with great rapidity, and, alone and in connection with farms, breeding ponds or ranches are being extensively developed in several parts of the State. Frog propagation through the pond system enables farmers to supply thousands for commercial consumption. Canning laboratories also provide employment. The Honey Island and Tensas Swamps are great natural breeding grounds.

Not all Louisiana's frogs are born to be eaten. Some achieve fame as trained jumpers. Male frogs are reputed to be the fastest leapers; young females rank next, with old lady frogs making a very slow third. The wilder the frog, the better the jumper—snakes keep them in form. A group of selected Louisiana crayfish-fed frogs, trained for the purpose, competed in the Mark Twain Centennial Classic held in New York City Park on May 19, 1935. At the sound of a gun fired by Jack Dempsey, in tribute to Mark Twain's "Notorious Jumping Frog of Calaveras County", a beautiful Louisiana lady frog, tagged "Abbie Villerette", left her dozing fellow-competitors, gave three wild leaps in the air, and then settled down to sleep on her laurels.

LOUISIANA TURTLES FAMOUS THROUGHOUT NATION

Turtles are also brought in to the markets and restaurants by individual hunters. The bigger the better the price. In the realm of turtledom, where the fat female shines, tragic homage is paid to the portly lady turtle who commands the largest sums. Little bull turtles bring from fifteen to twenty-five cents each. A pen system of breeding, developed in the Baratarias, has proved satisfactory, and the Louisiana turtle has become commercialized to the extent that it now reaches New York consumers via the Fulton Fish Market.

Miniature turtles are supplied to curio and pet stores. In sections of Lafourche and Terrebonne Parishes, families engage in decorating the backs of these midgets with designs indicating that they are souvenirs of New Orleans, Dallas, and other cities.

ALLIGATORS AID MANY IN "BRINGING HOME THE BACON"

Around Honey Island, the Delta lands, Lake Catahoula, and the great Tensas and Caddo Lake swamp that stretches for sixty miles to the Texas border, hunting the alligators that abound is another way of bringing home the bacon. Captured in three ways, alligators are hunted by day and by night. In the day they are caught

Preparing Louisiana Bull-frogs for shipment to market.

Alligators are also a source of income and aid many in "bringing home the bacon".

by denning and by fishing. In dry weather, alligators look for hiding places. Wallows—large beaten down spots where they have wallowed—show the way to their holes, which, if no hollow tree is available, the alligators dig down at the water's edge and back about twenty feet. The hunter pokes a long stick down into the hole, barks like a dog or grunts like a pig, and the 'gator, anticipating food, grasps the stick in his mouth and comes up. The pole serves a dual purpose. It carries the voice down to the alligator, and lets the hunter know that the saurian is ascending. When the latter shows his face, the hunter grabs his mouth closing the jaws tightly. An ax blow at the base of the alligator's head does the rest. For fishing, a strong twenty-foot line with a large hook is used. The line is tied to a stump and allowed to coil slackly. When the alligator swallows the bait, he is able to move a short distance making it possible for the hook to catch in him. Pork is the favorite bait for alligators, but other meats are used.

By night, the swamp hunter goes shining and shooting. Shining is now done with flashlights and lanterns, but in olden days, a brazier, or pan with a small pine knot fire burning in it, was attached to the top of a stick. When held above the huntsman's head, so that his face was in shadow, the glow of the burning pine fell upon the prey. Trekking through the mire or paddling their boats along the stream, 'gator hunters now let their powerful lanterns beam upon the water. When a saurian swims by, his life is terminated by a shot. In dying, the alligator turns over and floats on his back. If he is merely wounded, he attempts to reach land where he is trailed and overpowered. The night's kill is skinned. Young alligators are the best to catch—when old their hides are almost worthless. The average hide runs around six feet and nets $1.00 to $1.50. Sometimes the flesh is used for food—negroes claim to enjoy the tail meat.

Alligators are not always killed to be converted into belts, brief cases, purses and other forms of leather goods. There is also a small demand for live ones. Hunters often go out to "bring 'em in alive" for carnival shows. This is risky business for even powerless, an alligator is not easy to lift from the mire. Alive, he must be lassoed, his jaws wired, and then tied firmly to a boat. It is no child's play. Hogs, calves and other animals, coming in close contact with alligators, have been eaten by them. In their holes, they are dangerous to frog hunters and others who invade their territory unprepared to meet them. However, most of the Louisiana alligator hunters are not even afraid of the devil. Catching live saurians is common in the Caddo Lake Swamp.

Lizards are likewise hunted for their skins and to supply pet and curio shops. The lizard is recognized as beneficial to man because he is an expert insect hunter. In the strawberry districts young people are paid to collect crickets from the berry fields. Lizards do the work gratis. Movements have been launched to prevent lizard extermination, but nothing has come of them. Parks, swamps, and waysides are scoured from March to October and thousands of lizards are sold through the New Orleans market. The oftener a lizard changes its color, the more valuable it is as a pet or country fair exhibit. Good catchers land from five hundred to one thousand daily. At one cent each, the average earnings during good weather are about $8.00 a day. Negroes also catch lizards for their voodoo rites. Dried and powdered they make reputedly effective *gris-gris* in matters of the heart—particularly for the type of young woman who aims to get her man by fair or foul means.

HONEY AND MOSS PROVIDE INCOMES TO MANY FAMILIES

The humble honey bee is another source of independence. Farmers and others engage in spare-time bee raising. At least one unemployed Orleanian who moved to the country found ease and peace of mind through this means. Salesmen bum rides or jump in their rattletrap flivvers to take house to house honey orders in the cities. The following day they deliver the goods. Flowers are studied to ascertain the different types of honey produced. Golden and white clover, wild asters, goldenrod, green willow blooms and vervain each produce a special kind of syrup. Chinese vitex and loquat or Japanese plum blossoms are favorites with bees. Experiments in blending are made to get honey suitable for table consumption. Uniform color is achieved by mixing spring, summer and autumn honeys. The dark-colored Louisiana wild honey, derived from pollen containing copper, iron and other minerals, is rich in healthful properties. Beeswax is swapped for honeycomb foundations.

Apiaries often yield around $1,000 per year to part time operators. The expenses entailed are few. Certain beliefs are maintained in the honey producing

A moss gatherer bringing home a boatload of moss. Spanish moss produces an annual income in the state of between one and three million dollars.

business—these like its seasonal syrups blend effectively:

A bee swarm in May is worth a load
of hay;
A bee swarm in June is worth a silver
spoon;
A bee swarm in July is not worth a fly;
And bee combs are fullest in the full
of the moon.

The Indians named the gray moss that festoons Louisiana's oaks and cypresses *itla okla* (tree hair); the French and Spanish each dubbed it after the other's beard. To many of those who engage in moss picking for profit, it is still familiarly known as *Barbe Espagnol*—the Spaniard's Beard. The moss industry affords the steadiest means of employment in the swamp areas. During the summer when the fishing season is in progress and before cane cutting and trapping begin, moss gatherers are active, but picking is at its peak in the late fall and winter. Colonies of moss pickers dwell along the canals and bayous, and deep in the jungles both white and black swamp inhabitants make their homes in crude thatched isolated shanties from which they paddle to the gray-draped trees. Hooked poles and rakes are used for pulling the Spaniard's Beard, while spiked boots make tree climbing easier. On a single trip, one man can pick two to three hundred pounds. Averaging one and three-fourths to two and three-fourths cents per pound, a family of moss pickers, working even part time, can net at least $1.00 a day. This sounds like very little, but it suffices for the swampdweller's extra needs.

SPANISH MOSS IS LOUISIANA'S "LAGNIAPPE CROP"

Some day, perhaps, bayou people will all have marsh buggies—those strange-looking automobile-boats that travel on land, water and trembling prairie with equal ease. Now, moss pickers use motor boats that tow skiffs, and oar-operated "challons" (*chalands* or flatboats) such as swamp people have used for generations. Skiffs and flatboats are loaded with gray moss to be brought home for curing. At one time moss was temporarily buried, but this process made too much unnecessary dirt. It is now immersed in the bayous for several days, after which it is piled on the banks and sprinkled with water, and then spread along fences and racks to be cured by the rain and sun. When dry and a deep brown, the Spaniard's Beard is ginned. All dirt, stems and leaves are removed. Cured moss, baled, brings around $2.25 per hundred pounds. Moss gatherers supply mattress makers and furniture upholsterers. Green moss is used for decorative purposes. Know as the "lagniappe crop" of Louisiana, Spanish moss (*Tillandsia usenoides*), an epiphyte propagated by fragments, requires neither planting nor care, yet it produces an annual income that runs between one and a half and three million dollars.

Wild fruits help keep the larder filled and also add a little revenue. Berries are the most profitable wild crop of this class. The spring morning air reverberates with the cry of the buxom black *marchande*, who, balancing a huge basket on her head, trudges through the streets peddling "Black-ber-ries! Fi-ine black- ber-er-ries!" Huckleberries are also sold. Elderberries are gathered mostly for private consumption. Pies and wine are made from the fruit; tea for fever from the leaves; branches are placed under the house to chase away fleas; and the flowers dampened are worn under tignons and hats to prevent sunstroke. Muscadines, scuppernongs, maypops and crab apples are all used in making wines and preserves, while cherry bounce is produced from the small black wild cherry. The native Indians make beer from wild persimmons, but for the most part these *plaquemines* are eaten as fruit. The fruit of the prickly pear is transformed into candy. Chinquapins and hickory nuts are also gathered. The latter are delicious, but the shells are difficult to crack.

On both sides of the Mississippi, wherever wharves have not encroached, among the willows outside the levee, squatters have built crude huts of driftwood and wrecked boats. Along the New Orleans batture, shacks extend between Walnut street and the U. S. Engineer's office at the foot of Prytania street, continuing again above the oil wharf near Carrollton avenue to the Sewerage and Water Board at Protection Levee. As long as they do no damage, squatters are permitted to stay, subject to removal at the pleasure of the levee board. These people eke out a living by fishing and salvaging wood from the river. Sawed into even lengths and split to a size convenient for burning, driftwood is stacked in battered jallopies and sold to stores and householders. The levee willows are also converted into cash. Branches are worked into rustic porch and garden furniture—tabourets, settees, armchairs, rockers, ferneries and baskets are attractively fashioned from willow with and without the bark. Some of this furniture is made by transients in tourist camps or temporary squatters. Not long ago, inexperienced craftsmen were responsible for the poisoning of several persons by joining wicker chairs with poison ivy. Nevertheless there is a demand for willow furniture. Possibly this is because it does not survive to reach the second-hand market. The average person prefers it in its rustic state, and when thus exposed to rain and sun, the bark becomes water soaked and the framework splits and rots. Peeled, dried out and painted, willow garden chairs will endure almost as long as any wooden outdoor furniture.

"TASO MAKING" PROVIDES OPPORTUNITY FOR COURTSHIP

Among the Houma Indians and the Cajuns, during a festive occasion called "taso making", willow branches are used for fish traps and smoking grills that are set up on the beaches. Taso time comes in the warm spring days of March and April. The Houmas go out looking for big fish for their fiesta. Some are caught in the Gulf, but others are trapped with willow frames in the streams and taken up by hand. Children gather driftwood for fires. Damp wood is generally used as it does not burn freely. The smoke gives the fish a distinct tang, and it drives away mosquitoes. Foot-long fish fillets are laid on a willow grill or held over the fire on forked limbs. Taso making is a communal institution designed to bring young people together and encourage courtship. The Cajuns, who have adopted the word from the Indians as well as their taso making methods, light charcoal braziers in hogsheads over which they place fish on grills. They also string fishes, rabbits and opossums across the flues of adobe chimneys.

Along the levee, aged negroes gather slim branches which they sell as clothes poles. These kindly gray-haired vendors of neatly-trimmed saplings, with their familiar cry of "Clo'es poles, lady! Clo'es poles!" are regarded by old fashioned cooks as precursors of forthcoming rain.

Aside from their great value as lumber, the piney woods offer work in numerous turpentine stills. Cutover lands provide pine knots for winter hearth fires, and pine cones are used not only as fuel but for many decorative purposes. Burrs are tinted, gilded and combined with berries, greens and colored leaves, both real and artificial, for Christmas door wreaths, table centerpieces and even holiday corsages. At the turpentine stills, pine cones, flowers, vegetables and other objects are dipped into the molten rosin which preserves them for ornamental purposes with a permanent shellac. Pine needles are woven into luncheon mats, baskets, hats and other straw objects.

PALMETTO FRONDS USED TO WEAVE FANS AND OTHER ARTICLES

Pirigues are hewn out of cypress logs, and to make hanging flower pots and bird houses, cypress knees are hollowed out and bored with holes. Native palmettoes, of which there are three varieties—the common dwarf and the saw palmetto that grow from North Carolina to Texas, and the *Sabal Deeringiana*, found only in the Frenier Beach vicinity near Laplace—are becoming popular for dressing up building exteriors during holiday seasons. Fronds are used for background and facade ornamentation on small structures. Long ago the Indians made hats and baskets of *latanier* (palmetto) which were swapped for other commodities at the markets. The descendants of the Indians and other native Louisianians still weave mats, fans, baskets and wide-brimmed sombreros from palmetto fronds. On Pecan Island, *latanier* is used for roof-thatching. Chimney sweepers carry great bunches of it for cleaning flues. Bamboo and wild reed cane are also used in making straw articles.

Magnolia flowers are supplied to perfume manufacturers and brought in in March to flower shops. Magnolia leaves and branches are becoming popular as home wall and stairway decorations for ceremonious occasions. From wax myrtle (*serier* or *cerier*), crude greenish candles, such as formerly supplied light for colonial Louisiana, are made. It is considered good luck to burn one if these candles on Christmas eve night.

Bay leaf, sage and dried sassafras leaves are brought to the markets for seasoning. The latter makes the fragrant filé used in Creole gumbo. *"Concombre zombi"*—Jimson weed (*Datura stramonium*)—is gathered for many medicinal purposes, especially for fever tea. Wild hibiscus is used for making glue and candy—marsh mallows. Deer tongue and vetiver are gathered for sachet. Although not native, having been brought to Louisiana from the East Indies as an ornamental plant by early colonists, vetiver, which spreads by division of the original root, now flourishes as a wild plant in many localities. However, it is also cultivated and commercialized. Vetiver, or cus-cus grass, resembles swamp cat tails, except that it bears a lavender tassel. Looking like broomstraw and hay, it still can not be used for sweeping or as fodder. In the East Indies, vetiver oil supplies a well-known perfume and the reeds are woven into mats and curtains. Here in Louisiana, the grassy tops are cut away and the roots are dried and put up in one ounce cellophane packages for sachet. In fresh roots, the odor is not so apparent, but when dried, vetiver possesses a strong fragrance that endures for three or more years. Like lizard powder, when crushed on a handkerchief that is frequently displayed, vetiver is recommended as a positive lure to make men fall.

Dogwood, marsh cane, pitcher plant flowers, irises and other wild blossoms are brought in mud-spattered cars to the city florists. Spider lilies, ferns and wild azaleas are supplied to gardens featuring native flora. The beautiful water hyacinth creates work for man through its own extermination. Forces of laborers are kept busy removing hyacinth roots from the bayous with hoes, pitchforks and mangle-boats so that navigation may not be impeded. Numerous weeds can be converted into dye, and when the dusky swamp-dweller engages in a little vodoo on the side, countless roots and herbs are turned into profitable usage.

LIFE IS SIMPLE BUT NEVER DULL AMONG "SWAMP" PEOPLE

Surrounded by great stretches of beauty, it seems paradoxical that color is said to be the one thing needed in the lives of the swampfolk. Yet, even the negro who dwells in the depths of the wilderness knows the meaning of every sound and bird call emitted about him. When he sees clouds backing against the sun, he knows bad days are ahead. If there is no muskmelon around, and the swampdweller gets a scent of cantaloup in his nostrils, he knows that a moccasin is not far away. When this snake stays in his hole, cold weather is in the offing. Toadstools are never mistaken for mushrooms by men who know their wildlife. There may be gold "in them thar hills", but they know, those swamp people, that every teaspoonful of gold underground in these parts is guarded by a spirit. Life is simple, but never dull. Bayou poverty is not the distressing type found in cities. Because their wants are few and their mode of living makes careful dressing impractical, swampdwellers seem poorer than they are. Even though reclamation is constantly in progress—for many of the State's residential sections were once weird and solemn marshlands—wildlife areas are still vast enough to provide enough of today's bread and tomorrow's gumbo to keep many off the relief rolls. The swamp inhabitant's character is very strong—it has to be. As he putters about the dense jungles, he knows not at what moment a *loup-garou* will leap from being a moss-draped cypress or a dwarf will rise up in the trembling prairies and shake a finger in his face.

TRAPPING SEASON DECLARED ONE OF MOST SUCCESSFUL

The Louisiana fur trapping season, which closed on February 1st, was declared to have been one of the most successful, from a financial standpoint, since 1921. Although the fur crop was 50 to 55 per cent under what it was the preceding season, Armand P. Daspit, head of the fur division of the Department of Conservation, stated that the fur prices were higher than at any time in the past ten years.

Shortage in the fur production this season, was due to the disastrous storms last August in which thousands of muskrats and other fur-bearing animals were drowned.

Governor Sam H. Jones, Conservation Director W. H. Hodges, Jr., and others participated in a celebration on Marsh Island Sunday, February 2nd, celebrating the official close of the fur trapping season. At that time, Governor Jones distributed checks to the trappers who took part in trapping activities on the state-owned Marsh Island Preserve. The trappers declared that their checks were the largest they have been in years.

Cooperative Methods In Pollution Abatement

by
C. L. Davis, Jr.*

Conservation for the most of us has meant simply a restriction of the use of natural resources in order to prolong the supply of wildlife, game, forest products, and minerals. But when one delves into the subject further, it is surprising how many fields of endeavor are explored to carry out this single program. The biologist, forester, physicist, geologist, petroleum engineer, civil engineer, bacteriologist, chemist, and chemical engineer not to mention the coordinating efforts of the men behind the desk and the wardens in the field, all have their part to play.

In keeping abreast of the times, the most recent addition to the Department of Conservation has been the Bureau of Chemical Engineering of the Division of Research and Statistics. Since 1937 it has been actively engaged in the study of problems of industrial pollution of natural lakes and streams in Louisiana. It was realized that it would be useless to build hatcheries to restock streams where fish would not stay, and that it was unreasonable to restrict the sportsman without curbing the effects of encroachment by industry. Yet industrialization of our state is also of importance to us if we are to meet the increasing demand of better standards of living and do our part in the national defense program.

The Industrialist's Viewpoint

Some have thought, quite justly in some cases, that the industry was unconcerned about their wastes and their effect upon natural environment. From the industrialist's viewpoint, waste materials are monetary losses and indicate inefficiency. He is constantly striving to improve his operating conditions. With the increasing interest in stream pollution, waste studies have broadened to take into consideration the effect of these wastes upon natural conditions. In doing this the industrialist

■ An air view of the Gaylord Container Corporation plant at Bogalusa, one of the seven pulp and paper mills in the state participating in the cooperative plan of pollution abatement. Their expansion program of five to six million dollars for 1941 typifies the growth of this industry and indicates the pace which must be maintained in the work for control, treatment, and disposal of waste materials.

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* Chemical Engineer, Division of Research and Statistics.

is a conservationist as much as the true sportsman. Yet they do not speak the same language. For a better understanding, the Bureau of Chemical Engineering has been working with industry and with the conservationists to bring the two closer together.

Rapid industrial expansion in the south in the past few years has resulted in disorganized efforts in control, treatment, and disposal of wastes. In many cases months of hard expensive work were expended only to find that there had been a duplication of effort in some other part of the State. Changes within a large mill to overcome a set condition take months of intensive study and months to put into effect. For this reason duplication of effort in this field is our worst enemy. In the early period of the expansion of this bureau, the need of coordination of all activity in waste control was apparent if progress was to keep up with future expansion. For the sake of economy and efficiency the Department of Conservation has requested groups of industries to form technical advisory boards of their respective staffs to work with the Department under cooperative agreements.

Pollution Abatement

To carry out the work on a sound, permanent basis, regulation in the form of pollution abatement programs has been imposed upon the industries to supplement restriction through legislative measures. Flexibility has been obtained without loss of strength in fulfilling the purpose of the pollution laws of the state. This is an important necessary factor for progress as each industrial enterprise has individual problems and each locality has its individual requirements. However, under such programs, changes are gradual and are not obvious to the casual observer. A summary of the activity in one industry will illustrate the constructive changes that have taken place and that are now producing actual results:

Improvements carried out in pulp and paper mills strengthen the position of abatement programs. Records show the progress in methods of disposal, and plant efficiency brought about through intensive research. As a direct result of the activity of the division, the following may be mentioned as fixed footholds on the road to minimizing stream pollution by this industry:

1. Installation of safety devices to prevent abnormal discharges of concentrated wastes.
2. Segregation of waste liquors for the most favorable method of disposal.
3. Increased recirculation and reutilization of water.
4. Controlled discharge to the stream, of impounded wastes. This discharge is supervised by this Department, and based upon the principle of disposal by dilution.
5. Continuous records of waste discharge stream flow data, and stream conditions.

Momentum has been added to the abatement of stream pollution through the splendid cooperation of the technicians of the pulp and paper industry. As requested by the Department of Conservation, a permanent technical advisory committee has been created. It is interesting to note that this system of cooperative effort, wherein every unit of an industry is represented, is unique in this type of endeavor, and marks a forward step of the greatest significance. The functions of this committee in its relation to the Department are clearly outlined in the working agreement formulated by the committee June 29, 1940. The essential features of this agreement are as follows:

1. It is suggested that this committee meet with the Department of Conservation staff every sixty days to discuss problems of mutual interest in the development of a program to study stream conditions. Should occasion arise where additional meetings are deemed advisable, the Technical Advisory Committee stands ready to meet at any time.

Editor's Note—For years the Division of Research and Statistics of the Department of Conservation has been engaged in a study of various conservation problems.

This article pertains to the all-important problem of pollution. Other articles on research now under study will appear in future issues of the Conservation Review.

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2. Should the Department of Conservation require data from the various mills, it is our suggestion that mill representatives and department representatives meet and develop the type of data required, and the form in which it is to be presented.
3. Members of the Technical Advisory Committee agree to cooperate in the exchange of information pertinent to the study of stream conditions, in attempts at solution of problems that are of mutual interest.
4. The Technical Advisory Committee will arrange a program of papers relative to this problem, to be presented at joint meetings. These papers will be aimed at bringing out points that will be of mutual assistance.
5. The principle of co-operative financing of studies between mills is accepted. In studies of mutual interest among some or all mills, participating mills agree to jointly finance the studies in a manner to be agreed on by participants.
6. To avoid duplication of efforts at various mills, members will present at the next meeting of the Committee an outline of research in progress, and a resumé of previous studies, with the idea of coordinating the work at the various mills.

Other Recommendations

At a subsequent meeting of the Technical Advisory Committee with the Department of Conservation, resumés of previous studies, as well as of work in progress, were presented by the various mills and embraced the following, among many others:

1. Pilot plant bio-filtration clarification.
2. Chemical treatment of mill effluents.
3. Controlled discharge to streams.
4. Systematic stream studies.
5. Long range operation study of waste utilization.
6. Detailed surveys of water consumption throughout the mills.

The following problems of research were assigned by the Committee, and are now being intensively investigated:

1. The effect of Paper Mill white water on stream conditions.
2. The study of segregation of types of waste, their measurement, instrumentation, and control.
3. Topographic study in certain areas.
4. Water conservation as applied to white water utilization.

In addition, other phases of research being carried out at the Camden, Ark.; Moss Point, Miss.; Mobile, Ala.; Panama City, Fla., and Georgetown, S. C., plants of the Southern Kraft Corporation are available to this Advisory Committee. All told there are eleven groups of technicians actively engaged in related studies and experiments pertaining to the control of stream conditions resulting from the wastes from the pulp and paper industry.

STRICT ENFORCEMENT OF ALL FISHING LAWS UNDER WAY

Don L. Simon, chief enforcement officer of the Department of Conservation, has announced that strict enforcement of all fishing regulations is now under way in Louisiana. February 5th was set as the time limit for the sale of all types of fishing licenses, and those caught fishing with rod and reel after that date, or conducting any commercial fishing business without a license, will be subject to arrest.

Agents are not permitted to sell fishing licenses as was the common practice prior to last year.

Reorganization of Forestry Division Designed to Promote Greater Forestry Program

by
J. H. Kitchens, Jr.

Fifty-six per cent of the land area of Louisiana is in forests; forty per cent of all persons engaged in manufacturing are employed by forest industries in the state. These facts are proof enough that a greater forestry program must be stimulated. To make this employment permanent and to make our forest lands produce their greatest yield are the foundation of the Forestry Division's enlarged program.

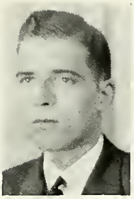
Two hundred years ago, people thought our forests would be ample to serve us always. Then came a period of exploitation and destruction. The forests were slashed, cut and burned with no regard for the future.

About three decades ago, Louisiana began to reach her peak of lumber production. It was about that time that the people in this state began to see, very faintly, the possibility that there would be a day when Louisiana would not have adequate forest resources.

Throughout the United States, the practice of forestry began to emerge. Into Louisiana, in the person of Henry Hardtner, this "new vision" found one of its earliest supporters. At first, this new thing called forestry was a foolhardy venture to many people. "It takes a hundred years to grow a crop of trees", they would say, "We cannot wait that long to benefit from a program involving so much time, trouble and expense".

But then the actual practice of forestry began to pay dividends to a band of faithful followers of the idea that under careful management, land can be made to produce a continual crop of trees.

Today, there is much evidence throughout Louisiana that this program has come to us in the nick of time. Mile after mile of devastated, cut-over, barren and burned land are evidence of an era of destruction to our timber resources.



J. H. Kitchens, Jr., Assistant Forester, is in charge of publicity activities for the Division of Forestry.

He is a native of Minden, La. and is a graduate of the School of Forestry of the Louisiana State University. He formerly held positions with the Soil Conservation Service and the Tennessee Valley Authority.

Nearly all our stands of virgin timber are gone. There are a few scattered areas of virgin pine stands left in the state and a little more of the virgin hardwood areas.

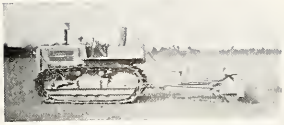
It is to rebuild, to reconstruct, to make amends for our past errors that our new forestry program is being launched with great vigor. True, we cannot restore our forests to their former beauty and fullness; but the land is here, the climate is ideal, and we have sufficient industry to utilize our forest products. With the cooperation of the citizenship of the state, our forests can once again be restored to a point where they will forever serve the best interests and welfare of Louisianians.

REDUCTION OF FOREST FIRES IS MOST URGENT PROBLEM

What will such a program involve? The first, and most urgent problem, is to reduce the tremendous losses that our land and timber suffer each year through forest fires. Great losses are also suffered through disease and insects, their entry into trees in many cases being brought about by scars left after burns. To materially reduce these losses will add much more volume to our timber production. To prevent these fires will allow many areas to seed in naturally and begin growing timber where they are today practically idle.

The solution to the forest fire problem is primarily one of education and cooperation. Nearly one hundred percent of these fires are man-caused and many of them can therefore be prevented. Lightning is the only cause of fires that cannot be prevented and the number of lightning fires in Louisiana each year is practically negligible. A large percent of these fires are purposely set by incendiarists laboring under the illusion that some good will result—that grazing will

■ **Mobile fire trucks, as pictured above (left) are now in use by the Division of Forestry for rapid action in fighting fires. (Right) One telephone maintenance unit is assigned to each of the four Districts of the Forestry Division in the state.**



■ **This is one of the new caterpillar tractors and fire line plow units used in building firebreaks.**

be better; that bugs, ticks, snakes and weevils will be killed; that healthier conditions will result. Many fires are the result of negligence and indifference—hunters, campers, smokers and brush burners. A campaign of education and a drive for public cooperation designed to point out the damages of fires, the benefits of protection and the means whereby they might be prevented is the most logical approach to this problem.

Once a start has been made toward reducing the losses incurred through fires, disease and insects, the next most essential need will be a program to increase the productive capacity of our forest lands through more skillful butting practices. A system of wise cutting and marketing of wood products will greatly increase the productiveness of wooded areas. The "sustained yield" policy is the goal of all forestry programs. This is a plan whereby land will be made to produce timber continuously in the future; one whereby as much timber is grown as is harvested. A selective cutting system, whereby every tree cut is carefully chosen on a scientific basis, will bring about increased growth in the forested areas.

More than a half dozen lumber manufacturing plants in the state are at present practicing sustained yield forestry under the direction of trained foresters. Many more are in a position to institute such practices.

The practice of scientific forestry does not apply alone to the large land holding concern, however. Farmers can produce higher grade products and make their woodlots "self sustaining" if they use their axes wisely and protect their woods from fire and grazing.

PLANTING PROGRAMS NECESSARY IN MANY AREAS IN STATE

Since many of our present wooded areas are not fully stocked, that is, do not contain the correct number and composition of trees, a little less volume should be removed each year than is grown on those areas until they have become fully stocked. In this manner, each acre will be brought up to its greatest producing capacity and will give the greatest returns to the land.

■ **In its forest fire detection system, the Forestry Division operates 38 100-foot lookout towers similar to the one above. These towers are interconnected with each other and fire wardens by about 3,200 miles of telephone lines.**

On many areas in the state, where the land is completely barren, due to overcutting and burning, it will be necessary to carry out planting programs. The Forestry Division's nursery at Woodworth is to be enlarged and modernized to produce the seedling stock needed to meet these requirements. The Nursery has a capacity of approximately eight million seedlings which can be purchased for forest plantings at a cost of about two dollars per thousand.

To more adequately meet the needs of this enlarged program and to more efficiently perform the work, the personnel of the Division has been enlarged and relocated and modern equipment has been purchased. Four active Districts are in operation with headquarters at Hammond, in Tangipahoa Parish; at Oberlin, in Allen Parish; at Winnfield, in Winn Parish; and at Ringgold, in Bienville Parish. Each District is under the administration of a trained forester with a sufficient number of rangers, fire wardens, fire fighters, towermen and maintenance men to further carry on the program. The Division Headquarters are located in New Orleans. Here, besides the Forester and Director, Mr. Brashears are the Chief of Fire Control Activities, Mr. D. J. Risch, Jr.; the Director of Public Relations, J. H. Kitchens, Jr.; a head of the Management section yet to be named; and a fiscal man and three clerk-stenographers. The Nursery at Woodworth is also attached to the Division Staff and the Nurseryman there is Mr. J. E. Mixon.

The reorganization of the Division is not yet complete, but it is expected that final adjustments and assignments will be made by early summer and that the new program will be going at full speed.

When you go fishing, be sure you have your anglers license as conservation agents do not sell them. You must have a license in your possession before you go fishing. This applies only to those who fish with rod and reel.

CO-OPERATIVE FIRE PROTECTION

The owners of timbered tracts in Louisiana, or lands that are potentially forest-producing areas, should take advantage of the forest fire protection plan that is available through the cooperation of the State and Federal Governments under the Clarke-McNary Act of 1924.

Broadly, one section of this Act sets forth that the Federal Government shall cooperate with the States and private landowners for the protection of forest or cutover lands from fire. Under this plan, the private landowner is obligated to pay one half the cost of protection and the combined Government agencies the remainder. Under this arrangement, these landowners must pay two cents per acre per year toward the protection costs, or only one dollar for every hundred acres.

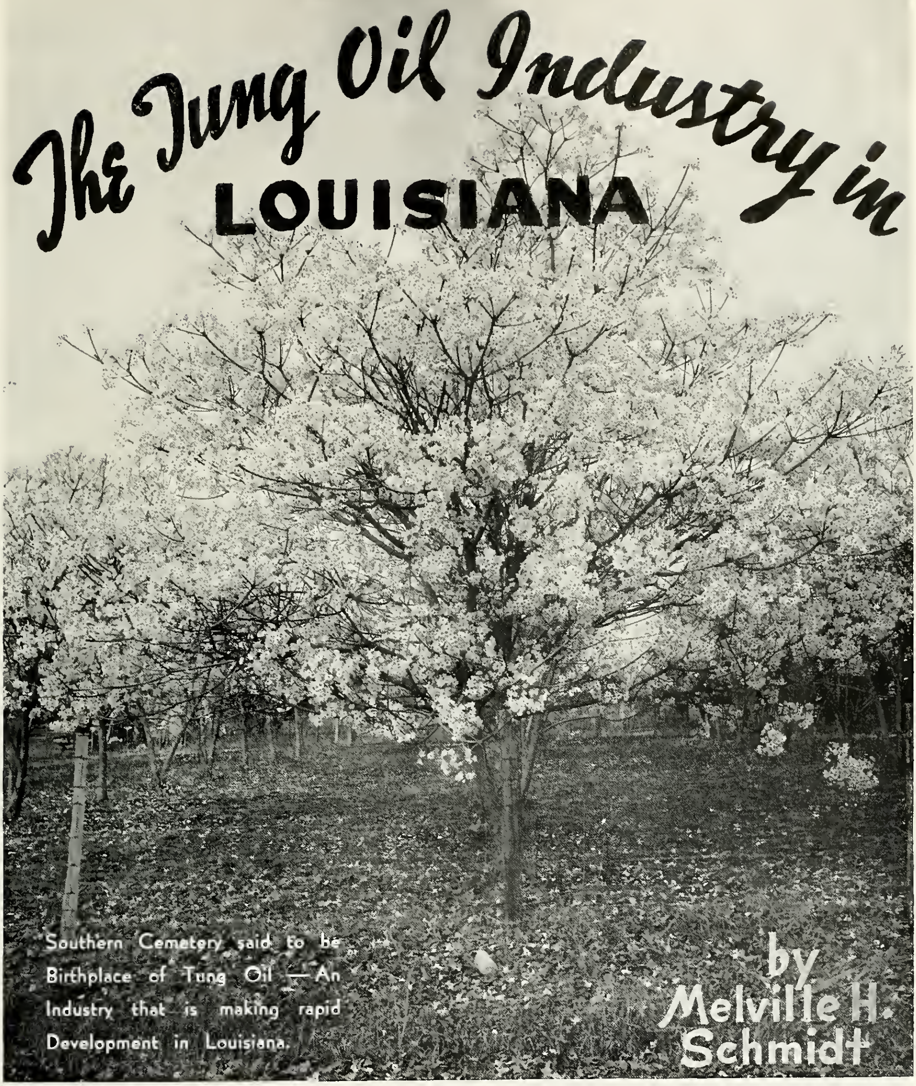
There are, at present, approximately 3,000,000 acres of forest land in Louisiana receiving organized fire protection under this cooperative agreement. In order to give these three million acres protection, it is necessary for the Division of Forestry to protect a gross acreage of 7,500,000 acres. The majority of these 4,500,000 acres, not at present receiving this cooperative protection, should be under the agreement. When these acres are under the cooperative agreement, additional wardens and fire fighting equipment can be installed to render a better service than these lands are now receiving.

The facilities of the Division of Forestry have been greatly increased to afford a greater fire protection service than ever before. The personnel of the Division has been increased and relocated; new equipment has been purchased to insure a greater effectiveness in the fire fighting activities; and a campaign of education and information, designed to create a fire conscious feeling among the general public, has been inaugurated to fulfill a long-felt need.

Thus, with the State and Federal Governments standing by ready to render assistance, and with the cooperation of the general public of Louisiana, Louisiana landowners should avail themselves of this privilege and receive insurance against further losses from uncontrolled forest fires.

The State Forester, Forestry Division, New Orleans, Louisiana, will be glad to furnish further information on this subject. Agreement forms will be mailed out upon request.

The Tung Oil Industry in LOUISIANA



Southern Cemetery said to be Birthplace of Tung Oil — An Industry that is making rapid Development in Louisiana.

by
Melville H. Schmidt

It is indeed strange that the birth of a domestic industry covering over 175,000 acres of land should take place in a small plot of ground in a Southern cemetery. Yet this is generally considered to be the birthplace of the domestic tung oil industry.

But before a new industry is born, a situation must usually arise to give it the needed impetus. According to Mr. B. F. Williamson this impetus was supplied by the rapid depletion of the fossil gums heretofore used in the manufacture of paints and varnishes. As a result, a closer examination was made of the remaining gums and substitutes. It was found that varnishes properly made from tung oil were much more resistant, particularly to water, than the older and more expensive varnishes made of linseed oil and fossil gum.

Perhaps the most accurate account of the beginning of the domestic tung oil industry is brought out by Mr. C. C. Concannon in his book, "Tung Oil", published by the U. S. Department of Commerce. He relates that the possibilities of domestic tung tree cultivation seem first to have been visualized by L. S. Wilcox, United States consul-general at Hankow, China. Mr. Wilcox reported having sent seeds in 1902, in 1903, and again in 1904 to a person in the San Joaquin Valley of California, and that plants from the first shipment had thrived. Early in 1904 a small quantity of tung seed was sent to Washington, D. C., by Consul-General Wilcox, and these seeds were placed by the Department of Agriculture with several experimenters in the warmer parts of the country. A few plants were obtained and some lived for two or three years, but all eventually died. In the meantime Doctor Fairchild, in charge of the Division of Foreign Plant

Introduction, had arranged with Mr. Wilcox to purchase and forward a considerable quantity of seed from which to raise young trees for extensive testing throughout the South and on the Pacific coast.

The larger shipment of seed was received by the Bureau of Plant Industry in 1905 and was planted at the Plant Introduction Garden of the Division of Foreign Plant Introduction at Chico, California. A large number of seedling trees resulted. When the trees were one year old they were shipped to State experiment stations, city parks, and cemeteries, and to private individuals throughout the milder parts of the country for test plantings. Fairly large numbers of trees were set out in Alabama, California, Florida, Georgia, Louisiana, Mississippi, South Carolina, and in Texas, while single trees were planted in a number of other areas.

LOUISIANA INCLUDED IN SO-CALLED TUNG OIL BELT

These early plantings indicated that the tung tree could probably be grown successfully only in an area known as the tung oil belt which begins in the middle of Florida and extends northward and westward keeping roughly within 100 miles of the Gulf until the western extremity is reached in east Texas. This belt includes the states of Florida, Alabama, Georgia, Mississippi, Louisiana, and Texas.

Five of the first seedlings cultivated by Doctor Fairchild at Chico, California, were dispatched to the superintendent of a cemetery at Tallahassee, Florida, and were planted but given little attention. In the autumn of 1906 William Raynes, of Tallahassee, became interested in the neglected plants and was given permission to transplant them. Only one of the five trees survived but that tree, still growing, serves as a monument to the early pioneering efforts to establish the culture of the tung tree in the United States. Assisted by a gift of 100 seedlings from the original tree, a neighbor of Mr. Raynes, Dr. Tennent Ronalds, became interested and planted a 4-acre grove near Tallahassee in 1912. This planting, later enlarged to 40 acres, became the first bearing grove of tung trees in America.

The establishment in 1923 by paint and varnish interests of the American Tung Oil Corporation, a non-profit making organization whose purpose was to demonstrate the possibility of producing tung oil in the United States was a really constructive factor in tung oil history. The corporation has admirably served its purpose even though its grove is not a success from the standpoint of fine trees or the production of oil. Rather do these plantings stand as evidence of the errors and of the mistakes that were made in the early days and, likewise, they may now serve as a warning to those who would go into the industry, by pointing out the pitfalls to be avoided in order that success may be obtained. A more material contribution from the plantings of the Corporation has been the great quantity of seeds and seedlings that have been shipped far and wide both in this country and abroad from which great numbers of tung trees have been forthcoming.

Among those also prominently connected with the creation of an American tung oil industry should be included the following: Dr. Henry Gardner, representing the American paint and varnish industry; Dr. Harold Mowry of the University of Florida; and Mr. Julian Arnold, American Commercial Attache in China.

Editor's Note—A tree imported from China has provided a new source of wealth in East Louisiana and Southwest Mississippi. A few rugged pioneers, with unwavering faith and courage in Tung Oil, have succeeded in developing an industry that is gradually reaching gigantic proportions.

Thousands of acres in Tung Oil trees are grown in Louisiana's tung region which includes Washington and St. Tammany parishes. Crushing plants located at Bogalusa and Covington extract the oil, currently worth about 26 cents a pound, and the product is eagerly sought by American paint and varnish manufacturers. The mill residue, once worthless, now becomes fertilizer of the grade of cottonseed meal.

The Tung Oil groves in Louisiana and Southwest Mississippi are still in the early stages of potential production. In a year or a few years the harvest may well reach two or three or even five million dollars.

LORANGER TREE IS "GRANDFATHER" OF TUNG OIL IN STATE

The history of the development of the tung oil industry in Louisiana would not be complete without some mention of the Loranger tree at Loranger, Louisiana. This is perhaps the oldest growing tung oil tree in Louisiana. It is 23 years old and may well serve as the grandfather of the Louisiana tung industry.

From the scant information obtainable, the real beginning of the tung oil industry in Louisiana seems to start around 1930. At this time the Great Southern Lumber Company obtained some seeds from Florida and planted 60 acres at Isabel, Louisiana. This was the first planting on anything resembling a commercial scale although smaller acreages may have been planted at an earlier date.

At about this time, or even earlier, Mr. Norman Core was developing plantings at Folsom, Louisiana, with seeds supplied from the Department of Agriculture. About a year later, Mr. Maurice Keen began planting tung trees around Waldheim, Louisiana. Largely through the efforts of these pioneers, a cooperative tung oil crushing mill was establishel at Covington, Louisiana, and this added materially in increasing the acreage in St. Tammany Parish.

Perhaps the tung oil industry in Louisiana would not have progressed so rapidly were it not for the many revealing experiments on tung trees conducted by the U. S. Department of Agriculture's Experimental Station at Bogalusa. The information that it has made public has saved many growers from going off on the wrong track.

Credit for early pioneering work must also go to the Natalbany Lumber Company and its plantings in St. Helena Parish. Mr. Walter Green, of Franklinton, has long been connected with the industry and should be counted as one of the pioneers.

Other men prominently connected with the ever expanding tung oil industry in Louisiana include Mr. Samuel Zemurray who has planted several thousand acres to tung around Bogalusa and who is constantly experimenting with ways to increase yields per acre; C. W. Goodyear of the Bogalusa Tung Oil Company, and Mr. Odenheimer who has planted several thousand acres in St. Tammany Parish, north of Folsom. The Great Southern Lumber Company now has about 6,000 acres planted in tung trees of various ages. This grove is at present showing the largest commercial yield—about one ton of nuts to the acre.

Experiments in budding, seed selection, and fertilization are constantly being conducted by the aforementioned men in order to spread the development of the tung oil industry in Louisiana. Through the efforts of these pioneers, the tung acreage in Louisiana has been increased to include over 20,000 acres of land. At present, there are two up-to-date tung oil crushing mills—one at Bogalusa, and one at Covington.

PRESENT PLANTINGS IN LOUISIANA

In Louisiana present plantings are of three types: (1) Strip, (2) Modified, and (3) Intensive. Strip plowing consists of plowing a narrow strip of land about three to six feet wide, among the stumps, with removal of only such stumps as will permit the plowing of this strip—allowing little or no cultivation or fertilizaton. Modified planting consists of removal of all or nearly all of the stumps, and partial cultivation with little or no fertilization. Intensive planting consists of complete clearing and proper selection of the land, soil analysis, thorough plowing and disking, terracing in accord with the U. S. Government regulations, planting of selected nursery stock, at least two cultivations per year, fertilization and cover cropping, and shaping of trees for heavy production.

RESULTS FROM PRESENT PLANTINGS

Strip plantings have received a thorough test over the entire tung area, as the majority of the earlier plantings were of this type. Trees so set out have resulted in little or no production and the failure of such plantings has undoubtedly had a bad effect on the tung industry. But these plantings have served to demonstrate that tung tree plantings should receive the same attention as to proper selection of lands, cultivation and fertilization as other orchards.

Modified plantings have shown a marked improvement over strip plantings, but have fallen far short of the results obtained by intensive methods. They have shown a marked variance as to the amount of cultivation and types of fertilization used, and have failed to realize their full possibilities of production mainly because of the lack of a definite program of cultivation and fertilization.

Intensive plantings have by far shown the most satisfactory results. Costs are practically double that of the modified type of planting, but the yields per acre more than make up for the added costs. On rather small groves yields of 4,000 pounds of nuts to the acre are not extraordinary.

The results from strip plantings have been so negligible as to condemn this type of planting—yields of as low as 100 pounds of nuts and even less being obtained in many cases. At this rate, current expenses, such as harvesting and milling, would absorb most of this yield. Modified plantings have been tested out over many acres. According to a survey made, a commercial grove of nearly 10,000 acres produced about 2,500 to 3,000 tons of fruit, an average of from 400 to 600 pounds per acre. In the same locality on the same type of land, by intensive methods another grove produced 1,400 pounds of nuts per acre. Owing to the variance in soil conditions, seed selection, cultural attention, weather, and a number of other circumstances only a

■ New hope for Louisiana's Agriculture is found in the tung oil plant, which provides the makings for varnishes, paints and a variety of other products. Here are some typical scenes in the Louisiana tung oil belt.* (1) The ground has been cleared and destumped and has been planted with seedlings.

(2) Close-up of tung oil tree showing tung oil nuts ready to be picked.

(3) The harvesting crew at work. The nuts are taken later to crushing plants where the tung oil is extracted.

*(*Photographs courtesy C. W. Goodyear, President Bogalusa Tung Oil Company.)*

general idea can be given as to what the tung grower may expect in yields from his grove. However, at the present writing, the average, well-taken-care-of grove of about eight-year-old trees that is situated on well-drained land that has been completely cleared, that has the right soil characteristics, that has been cultivated and fertilized regularly, is yielding a ton of nuts to the acre. Though acreages yielding as high as a ton and a half to two tons of nuts to the acre are not unusual.

Thus from an analysis of the yields that are available from experimental groves using all three methods of cultivation, it would appear that the only intelligent way of growing profitable acreages of tung trees is to carefully select land having all the prerequisites for successful tung tree growth and to use only intensive methods of propagation. It would seem that the results attained from the other methods have not at all been up to expectations—that while some profit has been made, it has been so small that when applied to the original investment it would take at least 14 to 15 years to get it back. In view of the risks involved, such as fire, wind, and frost, this is too long a time to wait.

It is said by some growers that one can expect two out of five years to produce little or nothing because of frost damage when the trees are in bloom. Constant selection for hardier tree varieties, more uniform tree production, and greater oil content, are of prime importance to the industry. The best financial returns may be expected from groves on which proper methods of cultivation have been employed to insure a maximum production, rather than from larger acreage improperly planted and maintained.

MANY USES FOR TUNG OIL

Tung oil, when used in varnishes, tends to make the product waterproof and reduces its liability to crack. A strictly waterproof varnish cannot be made without the use of tung oil. The oil is also one of the best "dryers" known. Paints made with tung oil give a much glossier finish than ordinary paints and seem more resistant to fungus attack.

In addition to being an important element in the making of varnishes, paints, lacquers, and enamels, tung oil is used extensively in the manufacture of linoleum, oilcloth, and top dressings. It is also an indispensable ingredient in the waterproofing of a great variety of fabrics. The oil is used in the manufacture of soap and as a dressing for leather. Fatty acids from it are used in the making of substitutes for shellac and, in combination with rosin, waterproof or spar-varnish. Combined with aluminum oxide it is made into aluminum tungate which is used in fireproofing and waterproofing numerous materials.

In addition to the above uses, tung oil is used extensively in: Lithographic printing, insulating varnishes for electrical use, aeronautical fabric applications, in combination with textiles as a protective coating, brake linings, wood preservatives, fish-net preservatives, medicines, insecticides, waterproofing concrete, boat calking and preservation, as a waterproofing material for cartridge shells, and in the making of India Ink and lampblack.

WARNING TO INVESTORS

Promoters of tung oil corporations have done a lot of advertising of the large profits that can be obtained from growing tung tree orchards and of the little care required after once planting the trees with the idea of selling planted groves to investors at rather high prices per acre. However, it has rarely been pointed out in these advertisments that uncleared land may be purchased in some sections for as low as $5 an acre, and that the cost of growing young trees and transplanting them in groves is very low. A buyer of one of these promoted groves often has to pay from one to two times the actual cost of the grove. Such information should be brought to the attention of investors so that they would not be expected to purchase groves at highly speculative prices.

In order to receive the highest return obtainable, it is best for the investor himself to buy the land, set out the trees, care for the grove, and collect the crop or else contract with a competent tung oil man to do this and pay him on an acreage or money basis.

Tung trees will not grow on every type of land and it is very important that well-drained land having the right soil characteristics be selected. A careful survey by an expert should be made and corings taken at intervals throughout the entire acreage. Information should also be obtained as to whether substantial yields of fruit have actually been produced in neighboring groves. Once the trees are planted they should receive careful cultivation and attention if they are to produce good yields. It does not follow that because a location is within the tung oil belt that it is suitable for the growing of tung trees as the drainage may be poor or the soil may be of the wrong kind.

According to those close to the industry, the following soil conditions should be avoided: (1) a soil in which the water table is within 12 to 15 feet of the surface of the ground, (2) a soil underlaid with a hard impervious subsoil or one in which pipe clay predominates, (3) distinctly alkaline soils, (4) very poor soils, (5) land which has not been sufficiently cleared to allow thorough cultivation, and (6) soils infested with insects and diseases affecting tung trees. It is essential that the requirements in soils, drainage, climate, fertilization, stock selection, and cultivation be thoroughly understood before attempting to propagate a tung grove.

The fact that China alone now produces the world supply of tung oil should be of grave concern to consumers as dependence upon a foreign source for an essential raw material is never desirable. The United States' almost complete dependence upon a foreign source of supply should cause the people of Louisiana to devote serious attention to the development of a domestic tung oil industry. In turn, the economic value that would accrue to the state through the utilization of the present large acreages of inactive, cut-over lands, the building of new oil mills, the employment of home labor, and the drawing to Louisiana of large consuming industries would be great indeed.

THE CONSERVATION BOARD

(From the New Orleans Item)

Governor Jones' appointments to the Conservation Board strike us as excellent. This body will take over the functions of the old Conservation Commission except those affecting oil and other mineral resources. Mr. Jones evidently had its special needs in mind.

The Conservation setup already included Commissioner W. H. Hodges, of Bossier, who has been successful in his own affairs and is well acquainted with forest problems and some of the State's other resources, but lays no claim to particular knowledge of wildlife.

But we note Gordon Millet, of Houma, among the new board's members. Here is a young and energetic chap of high character, who has had a lifelong personal and family connection, both in business and as a sportsman, with the fish, shrimp, and oyster businesses, and trapping and trading in our fur animals, along with intimate acquaintance with the types of men on the southern waters and marshlands who make their livings in those fields, with which so much of the Conservation Department's business is concerned. You can't beat this for qualification.

We note also the name of President McCormac, of the Louisiana Wildlife Federation, one of the State's most outstanding sportsmen and devotees of conservation for fish and game. John M. Parker is another who is well informed in the same field. Several lumbermen and others fill out the list. We recognize some other outstanding men in it and have no reason to doubt that all the rest are qualified by capacity and good intentions.

Charter and By-Laws of Louisiana Wildlife Federation

CHARTER

BE IT KNOWN, That on this Thirtieth day of October in the year of our Lord one thousand nine hundred and forty;

BEFORE ME, JOHN L. TOLER, a Notary Public, duly commissioned and qualified in and for said Parish and State, therein residing, and in the presence of the witnesses hereinafter named and undersigned:

PERSONALLY CAME AND APPEARED,

The undersigned residents of the State of Louisiana and subscribers hereto, who declare that they do hereby voluntarily associate themselves together for the purpose of organizing and forming a nontrading corporation under the provisions of the laws of the State of Louisiana and particularly under Act 254 of 1914, as amended, (which corporation is not designed to engage in trade or in the exploitation of property rights or credits for profit or financial gain) with all the rights, powers, privileges, benefits and immunities given or permitted corporations so formed, and for that purpose hereby adopt these Articles of Incorporation.

Article I.

The name of this Corporation shall be: LOUISIANA WILDLIFE FEDERATION, INC. Its domicile shall be the City of New Orleans, Parish of Orleans, State of Louisiana. The length of time during which this corporation shall exist and continue is fifty (50) years.

Article II.

This Corporation is formed for the following purpose or purposes, to-wit: To restore, preserve, develop and increase the birds, fish, game, forestry, wild flowers and all other wild life resources of the State of Louisiana extending to and including all matters and things which in the judgment of the Board of Directors, or of members of this Corporation may assist or encourage the advancement of the material, prosperity and progress of this State or any portion thereof, but not to include for its purpose or purposes the engaging in trade or the exploitation of property, rights or credits for profit or financial gain.

Article III.

The Corporation shall have the following powers: 1. To accept donations to be used for the purpose or the purposes of its formation; to do each and every thing necessary, suitable or proper for the accomplishment of any of the purposes or the attainment of any one or more of the objects herein enumerated; and, in general, to have and exercise all the powers, privileges, and rights now or hereafter authorized or allowed nontrading corporations under the laws of the State of Louisiana. 2. To sue and be sued; to buy, acquire, hold, own, lease, give as security, sell and otherwise dispose of, and exercise all privileges of ownership over real and personal property of any character, as may be deemed necessary or desirable for the conduct of the business of the corporation or incidental thereto.

Editor's Note—The Louisiana Wildlife Federation was organized at a statewide widely represented meeting in New Orleans on October 27, 1940. At that meeting Governor Sam H. Jones urged everyone interested in conservation to enter partnership with the State of Louisiana in promoting an outstanding program of conservation.

The charter of the Louisiana Wildlife Federation was filed on October 30, 1940. At present the Federation has thirty units throughout the State with a total membership of several thousand. New clubs are being formed all the time and the Federation eventually hopes to have a unit in every parish in the State.

Because of the widespread interest in the Louisiana Wildlife Federation, Inc., its aims and purposes, its articles of incorporation and by-laws are published herewith.

Article IV.

The officers and managers, who shall contract and manage the affairs of this Corporation, shall be a President, a Vice-President, a Secretary and a Treasurer and such other officers (all as provided in the by-laws) as may be deemed necessary for the proper administration of the affairs of the corporation. The bylaws of the corporation shall fix the rights, powers and duties of the respective officers. Citation may be served on the President or on the Secretary.

The first officers of this Corporation shall be as follows:

Fred J. McCormac, whose address is Room 1025 Whitney Building, New Orleans, Louisiana, shall be President.

Henry E. Cabaud, Jr., whose address is 608 Whitney Building, New Orleans, Louisiana, shall be Vice-President.

Paul McIlhenny, whose address is P. O. Box 1100, New Orleans, Louisiana, shall be Secretary-Treasurer.

The Offices of Secretary-Treasurer are combined in one office until changed by the By-Laws.

Article V.

The amount of dues and the kind and class of membership shall be as provided in the By-Laws.

Article VI.

The management of the business and conduct of the affairs of the corporation and the election of its Board of Directors shall be as provided in the By-Laws. The By-Laws may be made, altered or amended by the Board of Directors subject to the right of the members to alter or repeal all or any part of said By-Laws at any annual meeting, or other meeting duly called for that purpose. The Board of Directors shall consist of not less than fifteen (15) members and not more than thirty-five (35) members and number (within the above limits) together with their eligibility, manner of election, term of office and apportionment among the different parishes and Congressional Districts of Louisiana shall be as provided from time to time in the By-Laws of this Corporation. The First Board of Directors shall consist of twenty-seven (27) members. Directors may vote by written proxy.

Article VII.

The names of the subscribers of these Articles of Incorporation are as follows:

Fred J. McCormac
Henry E. Cabaud, Jr.
Paul McIlhenny
Ulisse M. Nolan
Angus Eason, Jr.
James O. Grout
Roger T. Stone

Article VIII.

The following shall constitute the members of the First Board of Directors:

Fred J. McCormac, New Orleans
Henry E. Cabaud, Jr., New Orleans
Paul McIlhenny, New Orleans
James O. Grout, New Orleans
Angus Eason, Jr., New Orleans
Roger T. Stone, New Orleans
Robert Learnard, New Orleans
Henry H. Chaffe, New Orleans
George Westfeldt, New Orleans
Ulisse M. Nolan, New Orleans
John Douglass, New Orleans
Bronier Thibaut, Napoleonville
Spencer B. Lake, Donaldsonville
Dudley Berwick, Eunice
LeRoy Dunn, Covington
Rodney L. Hubert, Plaquemine
Laigh C. Parker, Monroe
John Campbell, Baton Rouge
J. J. Besson, Baton Rouge
Vincent Moseley, Opelousas
Cenas Gaines, Lake Charles
W. J. Cleveland, Crowley
G. C. Vidrine, Oakdale
Hardy Durand, Lafayette
Dr. W. A. K. Seale, Sulphur

Kenneth McLaughlin, Amite
A. L. Irwin, Clinton

THUS DONE AND PASSED in my office, at the City of New Orleans, Parish of Orleans, State of Louisiana on the day, month and year herein first above written, in the presence of ETHEL SCHULE and FRANCES VICKERY, competent witnesses, who hereunto sign their names with the said appearers and me, Notary, after reading of the whole.

(ORIGINAL SIGNED)

Fred J. McCormac
Henry E. Cabaud, Jr.
Roger T. Stone
Angus Eason, Jr.
Ulisse M. Nolan
James O. Grout
Paul McIlhenny

WITNESSES:
Ethel Schule
Frances Vickery

John L. Toler,
Notary Public

I, the undersigned Recorder of Mortgages in and for the Parish of Orleans, State of Louisiana, do hereby certify that the above and foregoing act of incorporation of the LOUISIANA WILDLIFE FEDERATION, INC., was this day duly recorded in my office in Book 1589 Folio 286, New Orleans, 10/30/1940, 2:35 P.M.

(Sgd.) J. O. Scanlon, D. R.

BY-LAWS

ARTICLE I.

DEFINITION

SECTION 1. Federation shall mean the Louisiana Wildlife Federation, Incorporated.

Association shall mean local units or chapters of sportsmen's leagues, conservation clubs, wildlife protective leagues and other groups incorporated or unincorporated that are affiliated with the Louisiana Wildlife Federation, Inc.

State director means director of the Louisiana Wildlife Federation, Inc.

Association director means the director of local units or chapters which are affiliated with the Louisiana Wildlife Federation, Inc.

ARTICLE II.

BOARD OF DIRECTORS

SECTION 1. The first state board of directors were elected to serve for temporary terms or until they or their successors are duly elected by Federation members from their respective Congressional Districts.

SECTION 2. When a Congressional District has one hundred fifty (150) Federation members, the Federation's secretary and/or treasurer shall notify the proper officials or members or both in said Congressional District and from amongst their members they shall elect a state director. Thereafter for each additional one hundred seventy-five (175) members in said Congressional District they shall elect an additional director up until they have five hundred (500) members and three (3) directors, thereafter their maximum state directors shall be three (3), except as hereinafter otherwise provided.

SECTION 3. Method of electing state directors. Each state director other than the first board of directors shall be elected from one of the eight Congressional Districts of the State of Louisiana and he must be a resident of said Congressional District and must own a current State of Louisiana hunting or fishing license. Said state director shall be elected by at least one-third (1/3) or more of the federation's members of said Congressional District by written vote. Said written vote (letter addressed to the Federation's secretary and signed by a majority of the members or post cards mailed to said members signed by them or a combination of both), to be mailed to the secretary of the Louisiana Wildlife Federation, Inc.

SECTION 4. Except as to the first state board of directors, no Congressional District is to have more than three members at any time on said state board and no senatorial district, except those including the cities of New Orleans, Shreveport and Baton Rouge, are to have more than one member on said state board of directors.

SECTION 5. After the members of an association have voted for said directors and said state directors are members of their association and the state director is elected from their association, then the members of that association will not have the right to vote for additional state directors in their respective Congressional Districts, except as to the five directors hereinafter provided to be elected from the New Orleans Sportsmen's League of Orleans Parish.

SECTION 6. The New Orleans Sportsmen's League of Orlean Parish is hereby exempt from the By-Laws under Article 2 and may elect a maximum of five state directors, (said directors being members of New Orleans Sportsmen's League) until such time as some other unit should have more Federation members than said New Orleans Sportsmen's League.

SECTION 7. A nominating committee consisting of the Presidents of all local associations shall nominate candidates for state directors from their Congressional Districts.

SECTION 8. Sections one to seven inclusive under Article 2 shall govern the method of selecting state directors until such time as each of the eight Congressional Districts have five hundred (500) members and shall have elected three directors from their respective districts. However, directors previously so elected shall serve out their respective terms. That will give the federation twenty-four (24) directors. The additional directors from the New Orleans Sportsmen's League will be a total of twenty-six (26) leaving nine directors to be elected to fulfill the maximum of thirty-five (35) state directors as provided by the charter. The nine additional directors will be elected by vote from the floor by members of the Louisiana Wildlife Federation's Congress at the Federation's annual Convention from any parish or parishes in the state to serve for one year or until they or their successors are elected at the next annual Convention, but not over two of the nine to be from New Orleans.

SECTION 9. The Board of Directors, so elected, shall, from their members, elect annually a president, vice-president, a secretary and a treasurer. The office of secretary and treasurer shall be combined in one office.

SECTION 10. The Board of Directors shall supervise all of the affairs, properties, effects and business of the Federation. Shall have full and complete power by a majority of vote to acquire property both real and personal for the Federation and to dispose of property both real and personal in the name of the Federation. If any officer or member of the Board shall die, resign, or be removed before the expiration of his term or should a vacancy occur for any other reason, the remaining members of the Board may appoint a successor to serve during the unexpired term or until the next annual meeting or until their successors are duly elected and qualified. The Board of Directors and no officer or member will have the right or power to incur debts or obligations of the Federation beyond the sum which is then currently available in the treasury.

SECTION 11. Meetings of the Board of Directors. The Board of Directors shall hold regular meetings on the second Saturday of May in each year unless it shall by resolution fix a different day. Special meetings shall be held whenever called by the President or by five members of the Board. Three members of the Board shall constitute a quorum. In the event a quorum of less than a majority of the entire Board be present and a majority thereof vote affirmatively for a resolution said resolution shall not become effective unless and until a copy of said resolution be mailed by registered mail to the members of said Board, absent from said meeting and in the event the Federation does not receive written dissents from a majority of the entire Board within ten (10) days from the date of mailing said copies of said resolutions, said resolution shall be considered passed by a majority of the entire Board of Directors. At its regular meetings the Board shall proceed according to such regular order of business as it may by resolution adopt.

SECTION 12. Powers and duties of the State Board. The State Board shall have power FIRST, to suspend or remove from office any state director either for absence from more than two consecutive annual regular meetings of the State Board (unless such absence be excused), or for violation of the By-Laws or the rules adopted by the State Board; SECOND, to suspend for any cause deemed by the State Board sufficient any member (whether an association or individual) of the Federation; THIRD, to employ or authorize employment of an executive secretary and all other employees, fix their compensation and prescribe their duties, provided there is sufficient money in the Federation's treasury to defray the cost of same for period of time to be prescribed by the State Board, when, as and if, the time arrives that such contract or contracts are to be negotiated; FOURTH, to authorize the establishment and discontinuance of membership branches in the various parishes and other political sub-divisions of the state and prescribe the conditions under which said branches shall be established and conducted.

SECTION 13. Terms of office of state directors. The first director elected by the Federation's members from their respective Congressional Districts shall serve for a term of three years, the second director shall serve for a term of two years, the third director for a term of one year and their successors shall be elected for the same period of time that the director which they succeeded has served.

ARTICLE III.

DUTIES OF OFFICERS

SECTION 1. The President shall preside at all meetings of the state Board of Directors and all meetings of the Congress, and shall be a member of all committees ex-officio. The President will create committees, prescribe the method of their appointment and define their duties. He shall purchase or authorize purchase by others of any and all supplies necessary for the use of the Federation.

SECTION 2. The Vice-President shall perform the duties of the President in the case of his absence, or in the event of his failure or inability to act.

SECTION 3. The Secretary shall keep a record of all meetings of the Board of Directors and of the Federation; shall notify all members of the meetings, and in general, attend to the correspondence of the Federation under the direction of the President.

SECTION 4. The Treasurer shall keep the accounts, collect dues and assessments, make payments when and in the manner authorized by the President and/or the State Board of Directors and shall have charge of all funds of the Federation. He shall give such bond and in such form and in such amount as the Board of Directors shall from time to time provide. The first treasurer has executed a bond in the amount of $1,000.

ARTICLE IV.

LOUISIANA WILDLIFE FEDERATION'S CONGRESS

SECTION 1. Each organization in each parish having twenty or more members belonging to the Federation may elect two members to the Louisiana Wildlife Federation's Congress. The secretary of the local units will forward the names of said congressmen on forms to be prescribed to the secretary of the Federation. These congressmen will vote by written proxy or in person on all matters, business or otherwise, that confront the Federation that are not specifically provided for by these By-Laws and they shall vote in person only at the Federation's annual Convention or if they cannot attend, their local association may send another member or members to represent them and said members will bear a written authorization from the respective officers of said local associations. Said congressmen may transfer their right to vote to other federation members at the Convention by proxy, thus enabling them to have representation at all resolution committees simultaneously. Said congressmen from each local association shall have votes as follows:

SECTION 2. Each association having twenty members will entitle their congressmen to one vote and an additional vote for each additional twenty members up to a total of, but not exceeding, twenty votes. The maximum vote therefore for any local organization is twenty.

SECTION 3. The Board of Directors are hereby given power to refuse the right of any congressman to vote who, in their opinion, violates the rules, intentions or purpose of this Federation (large cities and communities will not be allowed to break their organization up into several smaller organizations, thereby giving them more votes. This shall be applied to New Orleans, Shreveport and other thickly populated communities who could have one or more leagues having over four hundred members each).

SECTION 4. Any member, officer or director may be a Congressman.

ARTICLE V.

FISCAL YEAR

SECTION 1. The fiscal year of the Federation shall end May 1st. The treasurer will prepare a financial statement listing the assets and liabilities and shall prepare an income and expense account itemizing in detail the income and the expenses of the Federation, said statement to be read from the rostrom at the annual convention and to be mailed to the presidents of all of the associations.

SECTION 2. The secretary shall prepare an annual list of all associations and list their officers and mail said list to the president of all associations.

ARTICLE VI.

MEMBERSHIP

SECTION 1. There shall be three classes of membership to-wit: Association memberships, club membership and individual membership. An association membership will be all of the local associations who are affiliated with the Federation. Club memberships will be local hunting and fishing clubs who wish to identify themselves with this conservation move (such as, the Coastal Club, Delta Club, Deer hunting clubs and established fishing clubs). The dues of these clubs will be $10.00 annually and they will be issued an annual letter and will be allowed representation at the Convention and will be given only one vote, regardless of the number of members they may have. Individual members are those who belong to the Federation direct, because they lack facilities in their communities to have an association.

SECTION 2. Certification of membership. Each individual member and all the individual members of associations will be issued membership cards denoting that they are members of the Louisiana Wildlife Federation, Inc., and also the name of their local association together with dues paid to certain date. Individual members of clubs will not be issued membership cards. Associations will be issued a letter or a certificate denoting that their association is a member of the Louisiana Wildlife Federation, Inc.

SECTION 3. Election of members. Members may join the Federation by rules prescribed from time to time by the Board of Directors.

ARTICLE VII.

MEETINGS

SECTION 1. The annual meeting shall be held on the second Saturday of May at such time as the Board of Directors may designate and then at such place as the Time and Place Committee may designate. Thirty (30) members shall constitute a quorum at any annual or special meeting of members, except meetings to effect changes in the Articles of Incorporation of the Federation, at which meeting a majority of members, present in person or by proxy, shall be necessary to constitute a quorum. Only members in good standing shall be allowed to vote at meetings of the members. Voting from time to time by members in good standing may be in person or by proxy.

SECTION 2. Special meetings. Special meetings of the members shall be held at any time when the Board deems it advisable to call the same and shall be called by the President when rquested by said Board.

ARTICLE VIII.

LOCAL ASSOCIATIONS

SECTION 1. Local associations shall from their members elect a president and a secretary and treasurer and as many additional officers as they choose. They shall elect a Board of Directors.

SECTION 2. Local associations shall through their members, officers, and directors conduct the affairs of their associations in any manner or form that in their opinion will best serve their purpose, so long as said operation is not in violation of the Louisiana Wildlife Federation's charter and by-laws.

SECTION 3. Local associations may elect their members and alternate members to the Louisiana Wildlife Federation's Convention in any manner they see fit.

SECTION 4. Local associations cannot duplicate the Federation's stationery.

ARTICLE IX.

DUES

SECTION 1. The annual dues to the Federation is fifty cents per year, provided said member belongs to a local association which is affiliated with the Federation. Members who do not have the facility to belong to a local association may join the Federation direct and their dues will be $1.00 a year. Members may join the Federation for as many years as they choose up to ten years and the dues increase $1.00 each year for direct members and fifty cents for each year for members who join through their local associations. The officials of local associations shall forward the Federation its proportionate part of all dues of members who join the Federation through their local associations for one or more years.

SECTION 2. Local associations may charge any amount they wish as dues to their organization, but they must forward the Federation fifty cents annually for each of their members.

STATE MAY HAVE CLOSED SEASON ON BLACK BASS, PERCH

A closed season on black bass and white perch during the spring spawning season in March and April may be ordered by the Louisiana Department of Conservation, according to announcement made early in February by W. H. Hodges, Jr., Director. The ban was recommended by the Louisiana Wildlife Federation.

Several parishes have already declared closed season on all kinds of fishing, according to information released by the Department of Conservation. False River in Point Coupee and East Feliciana parishes has been closed to all kinds of fishing. All the rivers and streams in Tensas Parish, with the exception of Tensas River, has likewise been closed for all kinds of fishing. Caddo Lake near Shreveport also has been closed.

News From Louisiana Wildlife Federation Clubs

(Editor's Note—The Conservation Review invites all conservation and sportsmen organizations in the state to report their meetings and activities for publication in the Review. This section will be a regular feature of future issues of the Review.

Let others throughout the state know what your organization is doing. Articles for the Spring issue of the Review should be in not later than April 5. Address your reports to the editor of the Louisiana Conservation Review, Civil Courts Building, New Orleans.)

ASCENSION PARISH

The Ascension Parish Sportsmen's League held its monthly meeting in Donaldsonville Monday, January 27, 1941.

The purpose of the meeting was to work out ways and means to prevent pollution of waters by sugar-mills in Ascension and surrounding parishes. Bill Chisholm of the Conservation Department explained some of the pollution problems and offered suggestions for their correcrection. H. L. McKnight also of the Conservation Department gave a stirring talk on "Cooperation between fishermen and hunters and state enforcement agencies."

A turtle gumbo was served and motion pictures were shown to the 300 guests in attendance. Dr. Spencer Lake is president of the Ascension Parish unit.

BATON ROUGE UNIT

J. J. Besson, secretary of the Baton Rouge Sportsmen's League, announces that they are conducting an essay contest on conservation for high school students in East Baton Rouge Parish. A cash prize will be awarded the winner.

NEW ORLEANS LEAGUE

The New Orleans Sportsmen's League at its December meeting, sponsored a duck-calling contest for the benefit of the members. Some of the best callers in that part of the country competed. A drive for new members was started and the member bringing in the largest number of new members will receive a framed etching by Fred McCaleb, nationally known wildlife illustrator. Mr. McCaleb is also president of the New Orleans unit.

ST. JAMES PARISH

The Vacherie Sportsmen's League was organized in January, 1941, with an original paid membership of 52 members. Vacherie is in St. James Parish. The organization meeting was conducted by H. E. Cabaud, Jr., Vice-President of the Louisiana Wildlife Federation. Motion pictures on fish and game were loaned by the Conservation Department for the occasion.

Officers elected were: H. M. Sevin, President; Emile Darenbourg, Vice-President; T. G. Pratt, Jr., Secretary-Treasurer.

Plans were immediately started for improving fish and game conditions in St. James Parish.

ALGIERS CLUB ACTIVE

J. H. Fledderman, President of the Westside Wildlife League of Algiers, reports his unit active and growing with a membership of 50.

ST. MARTINVILLE CLUB

Hardy Durand of Lafayette announced the formation of the St. Martinville Conservation Club with an original paid-up membership of 20. Officers of the new unit are D. A. Fournet, President; James J. Bonin, Vice-President; L. H. Boulet, Secretary-Treasurer.

WORK ON DEER PROJECT

The Allen Parish Sportsmen's Club is working on a plan to restore deer to Allen Parish.

This unit is sufficiently interested in the problem to offer physical and financial aid if necessary.

It is expected that the Conservation Department and this organization will get together as soon as the Federal Wildlife aid program gets under way.

McCORMAC SPEAKS

The East Feliciana Sportsmen's League held its monthly meeting during the latter part of January at Clinton, La. Fred McCormac, President of the Louisiana Wildlife Federation, was the principal speaker.

WASHINGTON PARISH LEAGUE

The Washington Conservation League of Bogalusa had an interesting meeting on January 16th. H. L. McKnight of the Conservation Department was the principal speaker. This unit has been doing good work in preventing game law violations, especially market hunting for quail in Washington Parish.

EAST CARROLL ORGANIZED

The East Carroll Fish and Game Association was organized at Lake Providence on January 28. Sheriff Elliot Coleman of Tensas Parish was the principal speaker. The Conservation Department was represented by John McCloskey, Director of Education, and by Supervisor Shaw Milliken and Agent John Gilbert.—Plans were started for improving fishing conditions in Lake Providence.

TENSAS SPORTSMEN MEET

A large audience was present at the Community House, St. Joseph, La., for the meeting of the Tensas Fish and Game League. Sheriff Elliot Coleman, president of the unit, introduced the speakers who were Edward McDonald, Mayor of Newellton, and John McCloskey of the Conservation Department. Cooperation between all civic, garden, and fish and game clubs was stressed in order to have a successful conservation program. Motion pictures were shown at the end of the meeting.

SUGAR MILL POLLUTION

The Iberville Sportsmen's League is working on the problem of sugar mill pollution of fresh water streams in Iberville Parish.

ST. TAMMANY ACTIVE

Distribution of fresh water game fish from the Lacombe Hatchery under the direction of Percy Viosca, Jr., of the Conservation Department was accomplished with the assistance of the Slidell Wildlife Club and the St. Tammany Sportsmen's League of Covington. Fish were released in several pits near Slidell also in Pearl River, Bayou Liberty and the Tchefuncta River.

BREEZY DAY *From a painting by Fred F. McCaleb, prominent New Orleans artist, whose work has appeared in many national sporting publications.*

Beautification of Highways is Major Project in State

[Continued from Page 18]

The Louisiana Federation of Women's Clubs have for many years, been engaged in a program of highway and roadside improvement. The cooperation of other statewide and local civic and service organizations will be sought to help make this program effective.

The Department of Conservation through its Divisions of Forestry and Education are cooperating in the statewide movement.

State Police to Cooperate

The Department of State Police headed by Superintendent Steve Alford has pledged support to the campaign by promising strict enforcement of Act 43 of 1932, which makes it a misdemeanor to destroy, injure, or cut trees, plants and shrubs within the rights of way of any state highway.

Mrs. James W. Reily of New Orleans, is chairman of the Roadside Development Committee of the Louisiana Garden Club Federation, and she has asked the support and cooperation of all other state and local clubs and organizations in the program initiated this year by her organization. "Our roads are an invitation to tourists to travel and to strangers to settle among us", she said. "The appearance of our roadsides is a great factor in determining whether the invitation is accepted or rejected and whether a good reference is sent on to friends".

Act 43 prohibiting the destroying or damaging of trees and plants along state highways, reads as follows:

"AN ACT

Making it a misdemeanor to destroy, disfigure, injure, cut or damage trees, plants and shrubs within the rights of way of the highways of the State, or planted pursuant to any highway beautification program of either the Highway Commission or the Conservation Department of the State of Louisiana, or both; and prescribing penalties for the violation hereof.

"Section 1. Be it enacted by the Legislature of Louisiana, That except by authority of the Louisiana Highway Commission, it shall be unlawful for any person, or persons, to in anywise destroy, disfigure, injure, cut or damage any trees, plants or shrubs of any kind whatsoever within the rights of way of the highways of the State, or planted pursuant to any highway beautification program of either the Highway Commission or the Conservation Department of the State of Louisiana, or both; provided, that trees, plants and shrubs of any kind within the rights of way of the highways, or planted on the streets of any municipality, may be cut or trimmed upon permission being obtained from the Louisiana Highway Commission or the municipal authorities of any city, town or village.

"Secton 2. Any person or persons violating any provisions of this Act shall be guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not to exceed one hundred dollars, or by imprisonment in the parish jail not to exceed sixty days, or both fine and imprisonment, in the discretion of the Court.

"Section 3. All laws or parts of laws inconsistent or in conflict herewith be, and the same are, hereby repealed."

NO DOVE

It is a common belief that the dove just discovered land during the flood of Noah' time . . . . The Bible states differently . . . . According to the records of Moses: "And it came to pass at the end of 40 days, that Noah opened the window of the Ark which he had made, and he sent forth a raven, which went forth to and fro, until the waters were dried up from off the earth."

The Bat---One Of Our Most Interesting Mammals

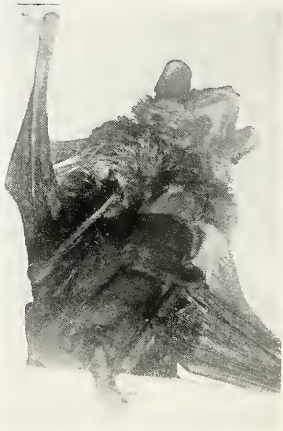
by
William H. Gates*

The bat is one of the most interesting of our mammals. It is the only mammal capable of flight and when compared to the flight of birds it is perhaps the more perfectly controlled. The flight of bats may lack the speed of some birds, but for sustained flying (not soaring) and control of direction the bat is superior.

They are very intelligent animals and in captivity learn easily and remember remarkably well. Two captive Big Brown Bats (*Eptesicus*) when returned to an outdoor room after an absence of nearly ten months instantly remembered a roosting place behind a board on a shelf. They can be easily taught to come for food upon a given signal, either sight or sound. The idea that a bat is blind is quite erroneous; they are quite keen sighted, although they are not dependent on sight for accurate flying.

The popular superstition that bats harbor fleas and bedbugs is only partially correct. The colonial forms do have such parasites as fleas, mites, and lice, but these vermin are of species which would not voluntarily attack man, since they are specific for the bat. The free living bats are relatively seldom infested, probably due largely to their mode of living. As for getting tangled up in one's hair, nothing could be further from the truth, for bats are altogether too adept at avoiding objects to get into the hair accidently, and if they did, they are too clever to ever let themselves get entangled. The idea of associating bats with the nether world comes through the fact that some species of bats are found in absolutely dark caves.

Many persons have attempted to keep bats alive under captive conditions. So far as the author is aware, no one has succeeded except over a very limited period, with active bats, and for but two or three months with hibernating bats. These failures have been due, according to the author's opinion, to the fact that the captive bats were fed on insect food, which is their natural diet, and which ought to be ideal. However, when one considers the fact that an *Eptesicus* bat is capable of eating over 300 flies in an evening, it is easy to see how a captive bat may starve to death when he is only allowed such insects that may get into a house during the twenty-four (24) hours. The writer has found that by feeding a diet of human foods supplemented with a few insects, dead or alive, that bats may be kept indefinitely in captivity. This refers to all species of bats found in Louisiana with the exception of the free-tailed species (*Tadarida*).



■ **Female Evening Bat (*Nycticeius humeralis*) suckling young.**

Bats Like Variety in Diet

Some species take to an artificial diet very readily (*Nycticeius*) and others more slowly and may even have to be trained (*Lasiurus*). Like humans, bats prefer a variety in their diet and will eat anything that we eat, except the salt meats. All kinds of dairy products, clabber, cheese, etc., are especially relished; next come the vegetables of all kinds, cooked or raw, and finally the meats. They do not relish peanut butter. The Evening Bat, for some unexplainable reason, has a preference for mashed English peas. Aside from this, the cheeses are the favorite food. This diet must be supplemented by some insect food containing chitin. Without this, the digestive system of the bats becomes upset and they will die. This insect food can easily be supplied in two ways; first, in the form of honey bees which may be obtained in quantities, killed and stored in a refrigerator for future use; secondly, in the form of meal worms, which can be kept alive and growing in a pan of meal, and the worms fed to the bats as they need them. The worms should be killed, cut up and well mixed with the food. The writer prefers the worms and allows about three to ten worms per bat per day depending on the size.

The writer has even raised young bats from an age of three or four days up to maturity. The young can be suspended from a finger and offered a little warm milk in a spoon. It will usually lap up the milk readily. As the young bat grows, the yolk of a hard boiled egg is added to the milk, and shorty after, insect food must be given.

There is an idea prevalent that bats carry their young with them until the young are able to take care of themselves. This would be a physical impossibility, as the weight of the young at birth may equal 1/4 to 1/3 the weight of the mother. In nature, it is probable that the young are carried for from three to four days, after that the young are left suspended while the mother forages for food. Bats have a remarkable homing instinct and never fail to return to the place where the young are left. The young, on the other hand, will not move more than a few inches from where it has been left. The mammary glands of bats are quite large and the milk secreted is relatively abundant. By weighing the young, the author estimates that a lactating female may secrete up to 1/8 of her own weight in milk per day.

All the Louisiana species of bats reproduce but once a year, and the number of young in the smaller species is uniformly single; in the Evening Bat however, it is consistently two, with only rarely a single young. In the *Lasiurus* the number will vary from two to four; probably never exceeding four. In the Yellow Bat the number will vary from one to three.

[Turn to Page 60]

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* Head Dept. of Zoology, L. S. U.

THE BATS OF LOUISIANA

by
George H. Lowery, Jr.*

In connection with the interesting foregoing notes by Dr. W. H. Gates on the life histories and habits of bats in general, it is considered appropriate that a list of the native Louisiana species be appended here. A total of ten species of bats are definitely known to occur within the boundaries of Louisiana. Additional surveys will doubtless add other forms, particularly those which are migratory from farther north.

The Museum of Zoology of the Louisiana State University will appreciate receiving specimens which might be sent in from any part of the state. It is in this way that a more complete knowledge can be gained of the distribution and relative abundance of the various forms. Live specimens are easily shipped in a box or container permitting unhampered breathing.

Georgia Bat
(*Pipistrellus subflavus subflavus*)

This is one of the smallest of our native species and probably one of the most common. Like most other bats in this state, it lives either in the hollows of trees or in the densely matted leaves. In the evening it is one of the first of the bats to appear on the wing, often coming out well before sundown. It is easily recognized by its small size and butterfly-like flight. Its yellow color distinguishes it from all other species except the very large Yellow Bat. Its food is entirely of insects, all of which it catches on the wing. It is resident in Louisiana.

Little Brown Bats
(*Myotis lucifugus* subsp.)

The Little Brown Bat is one of the most common bats in the eastern, northern and western parts of the United States. It is, however, very rare in the middle Gulf Coast region. Only two specimens have been so far recorded in Louisiana. Its rarity here may be due to the absence of caves, the favorite home place for the species in other sections of the country. A single specimen of this bat

■ Photo showing part of the bat collection in the Museum of Zoology of the Louisiana State University. The collection contains about 2,000 specimens of Louisiana Mammals. These are the basis of studies dealing with distribution and nomenclature. The glass vials seen in the trays contain the skulls which are used in identification and problems dealing with relationships.

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* Curator, Museum of Zoology, L. S. U.

was captured by Mr. Horace Hays at Provencal in Natchitoches Parish and another was secured by the writer on the campus of the Louisiana State University. The latter individual had the misfortune of flying into the Museum where he was promptly collected! The exact relationships of the Louisiana *Myotis* are not yet clear and additional specimens must be examined before this can be determined. In size the Little Brown Bat is comparable to the foregoing species, but its drab brown color distinguished it from that form. The species may breed in the state, but most likely it is only a winter visitor from farther north.

Big Brown Bat

(*Eptisicus fuscus fuscus*)

While this species definitely breeds within the borders of the state, it is doubtless much more common in the fall, winter and spring months when migrants from farther north are with us. Unlike some Louisiana species, the Big Brown Bat seems to have a preference for buildings, woodsheds, etc., and does not, insofar as we know, roost in trees. Specimens which we have examined from Ruston, Monroe, Baton Rouge and Hammond have all been taken from buildings of some sort and Mr. Hays reports them in like situations in Natchitoches Parish. The Big Brown Bat is a fairly large species and that coupled with its golden brown color makes it easily distinguishable.

Northern Red Bat

(*Lasiurus borealis borealis*)

This is one of the most handsome bats in Louisiana. Its color is a rich brick red and in most cases each individual hair is faintly tipped with white thus giving the animal a "frosty" appearance. It, like the two following species, dwells exclusively in trees finding for itself a densely matted clump of leaves in which to pass the daylight hours. In the evening it appears fairly late on the wing hence it is seldom noted much before dusk. It is, however, frequently noted about street lights where it likely finds that insect food is abundant. The Red Bat is common throughout the state and one may expect to encounter it in any particular locality. Unlike the Little Brown Bats and other colonial species, the Red Bat and its allies are largely free dwelling, that is, they do no group themselves together in colonies. Individuals are scattered, here and there. It has been observed, however, that sometimes one large tree will serve as a roosting place for as many as a half dozen separate individuals. Red Bats are rather rapid flyers and at the same time unusually erratic in the course which they follow. The zig-zag flight is followed rather high above the ground. These characteristics in rest and in flight, along with its medium size, long narrow wings, and the red color serve as good field marks.

Seminole Bat

(*Lasiurus seminola*)

The Seminole Bat is almost an exact counterpart of the foregoing species. Its size and structure are almost identical with the Red Bat. It differs only in its much darker, mahogany color. The Seminole Bat was once believed to be merely a color phase of the Red Bat, but its species validity is now pretty well established. While it is very common in the southern part of the state, it has not yet been recorded from many parts of the northern section of Louisiana.

Hoary Bat

(*Lasiurus cinereus*)

The Hoary Bat is apparently nothing more than a very rare visitor to this state. It has been taken only twice, once in Pineville in 1892 and again at Vowells Mill in Natchitoches Parish during 1940. Mr. Horace Hays who is responsible for the capture of the latter specimen reports that it was taken in a well lighted house after dark where it had doubtless gone in search of food. The species is like the Red Bat in many respects. It is a tree dwelling form and for that reason probably finds it necessary to migrate southward during the winter months. Its size is large and the color of the pelage is a dark reddish brown with a delicate "frosty" wash. Additional study of the bats in northern Louisiana will probably reveal this form to be much more common, than present records indicate, especially in the winter.

Florida Yellow Bat

(*Dasypterus floridanus*)

This is by far one of the largest of all our bats. The great size and the dirty yellow color makes it easily recognizable. The Yellow Bat passes the day in trees and to our knowledge has never been found at roost in a building. It is one of the first bats to appear on the wing in the evening, often being noted before the sun is well down. It is, probably by nature of its size alone, a steady flyer and one which follows a course high above the ground. At Baton Rouge, we frequently watched them come out of the big swamp east of the University and mounting gradually to a rather high altitude make directly in a straight and steady flight for the Mississippi River a mile or two to the west. The young, either two or rarely three in number, are born in May and June.

Evening Bat

Evening Bat (*Nycticeius humeralis*). The Evening Bat is one of the very common bats in this state. It has no special preference in the way of a roosting place and is therefore to be found in buildings as well as hollow trees. In color the Evening Bat resembles both the Little Brown and the Big Brown Bats. To distinquish it with certainty from the former, one must resort to counting the number of incisor teeth in the upper jaw. Large numbers of live, squirming, squeaking bats have been handled and quickly identified by this method. One only has to push the upper lip of the bat backward and expose the teeth in front. If there are two teeth in front of the canines on both sides in the upper jaw, then the species is the Little Brown Bat. If there is only a single tooth, the species is the Evening Bat. Bats also possess another valuable structure from the standpoint of identification. Located just inside the fold of the ear there is a structure known as the tragus. The size and shape of this structure is constant within the species and is therefore useful in determining to what form a specimen belongs. The Evening Bat, for example, possesses a short, blunt tragus while the Little Brown Bat has a relatively long, narrow and rather pointed tragus.

Leconte Big-Eared Bat

(*Corynorhinus macrotis*)

The Big-eared Bat, or Lump-nosed Bat, as it is sometimes called due to the presence of lump-like structures on the muzzle of the face, is one of the most striking of all bats in Louisiana. The ears of the species are extremely elongated and often measure an inch and a half in length. This character serves to distinguish the species from all other Louisiana bats. While at rest they often curl the ears in such a fashion as to resemble the horns of a ram. Little is known of the habits of the species in Louisiana. We have found it singly and in pairs in attics and out-houses and on other occasions in large colonies in hollow trees. While it is said to appear on the wing shortly before dark, the writer has never been able to identify it with certainty.

Leconte Free-Tailed Bat

(*Tadarida cyanocephala*)

This is by far the most abundant bat in the state and likewise the best known. It is on the basis of this species that bats come into general disrepute among citizens. Being colonial or gregarious in habits, it is never found except in large colonies. As true with many other animals which are gregarious in nature, this bat has a peculiar musty odor which is quite disagreeable. Moreover, after a colony has inhabited a house, church steeple or similar situation for any length of time the fecal material accumulates and adds to the unpleasant odor emanating from the surroundings of the bats. This excrement is known as "bat guano" and was at one time highly prized as a fertilizer because of its high nitrogenous contents. In late years substitutes have been found and the guano does not command as high prices as before. Owners or residents of buildings to which a colony of free-tails have become attached

[Turn to Page 60]

Mineral Resources In War and National Defense

by
Chalmer J. Roy*

Early in 1939, G. A. Raush, editor of the yearbook, "The Mineral Industry", wrote: "the entire history of the past twenty-five years may be boiled down to six words — war-readjustment — inflation — depression — recovery — recession — followed by a question mark." In 1941 much of the Old World is again at war and we of the New World are seriously concerned with the manifold problems of national defense.

We read and hear much of the importance of mineral resources, especially oil, to the warring nations. Hitler has said that this is a war between the *have* and *have not* nations and he was referring mainly to the distribution of mineral resources. Some have been bold enough to suggest the nature of the ultimate peace, and these without exception have included a stipulation that natural resources must be more equitably distributed and that all nations must have ready access to raw materials. In this country the discussion of national defense has been concerned mainly with the problems of mass production of planes, tanks and munitions. These problems have obscured the closely related problem of raw material supplies but the latter problems are no less real because of the lack of discussion.

AXIS OIL

There is continuous speculation in the press and on the radio about the oil supply of the Axis Powers. This problem is perhaps paramount, although any nation at war must have adequate supplies of a great variety of minerals. In any event, discussion here will be restricted to the oil problem and necessarily it must be mainly speculation as no data have been available since war started.

Western Europe requires about 45,000,000 tons of oil annually in peace time and it has been estimated that war demands will raise this to 70,000,000 tons. To what extent this estimate may be affected by the decrease in non-military use of petroleum products during war is not clear. We may be safe in assuming that the Axis Powers need at least 25,000,000 tons annually in total war in spite of economy in non-military uses. On this basis we may examine the production of Axis controlled areas to find what situation exists.

The production of oil in Germany proper has increased from 237,000 tons in 1932 to 647,000 tons in 1939. The annexation of Austria gave Germany additional oil amounting to 65,000 tons annually, Czechoslovakia produces 20,000 tons per year and Germany gained about 30 per cent of Poland's production which means 143,000 tons per year. Thus greater Germany produced 875,000 tons of oil in 1940. The Italian Empire produced 217,000 tons in 1939, 208,000 tons of which came from Albania. The recent German occupation of Rumania assures the Axis of the lion's share of Rumanian oil which amounted to 6,228,000 tons in 1939. The Rumanian production for 1940 was somewhat higher as indicated by figures for the first eight months of the year which showed the average daily production up 1500 barrels over 1939. France produced 70,000 tons in 1939 and it may be assumed that a large part of this is in Axis hands now.

Editor's Note—With national defense occupying the center of attention these days, this discussion by Dr. Chalmer J. Roy, is indeed timely and interesting.

Louisiana is occupying a prominent place in the national defense picture. Three large training camps are nearing completion at Alexandria and construction has started on another major cantonment at Leesville. National defense projects are also under way in New Orleans, Baton Rouge, and others are contemplated in other cities in the state.

Louisiana's industrial output and raw products are in great demand for defense preparations, and the state's strategic importance places it in line to receive more of the billions of dollars that are to be spent in the nation's national defense program.

AXIS OIL PRODUCTION 1939-1940

Greater Germany	875,000 tons
Occupied Poland	143,000 tons
France	70,000 tons
Italian Empire	217,000 tons
Rumania	6,228,000 tons
Total	7,533,000 tons

This production against the estimated needs of 25,000,000 tons per year is not as serious as it may seem. Russia is the major producer of oil in Europe with 29,530,168 tons in 1939. What portion of this, if any, is available to the Axis is unknown. However it seems unlikely that the Axis Powers can obtain enough oil from Russia to satisfy their estimated needs.

During 1940 there was much discussion of an Axis drive on the near East to obtain control of rich oil fields there. The combined production of Iraq, Iran, Bahrein Island, Arabia and Egypt in 1939 was approximately 16,500,000 tons. If the Axis could get control of this area the annual production under their control would amount to 24,053,000 tons. For the present however the Axis Powers can not count too much on immediate control of the Near East production.

Two other factors must be considered in appraising the Axis position with respect to oil. The first of these is petroleum products stored before the war began and the other is the production of synthetic gasoline from coal.

It is known that Germany is producing large quantities of gasoline from coal although accurate figures are not available. There are at least 25 plants in operation with a total estimated capacity of 3,710,000 tons of gasoline per year. Other plants are reported to be under construction in Austria and elsewhere well removed from English bombers. Of the 25 known plants in Germany proper the English claim to have bombed 20. This means that 80 per cent of the known producing capacity has been bombed but how serious the damage has been is uncertain. The plants are planned so that the separate processes are located in widely spaced buildings which makes it difficult to completely stop production unless all units are struck.

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* Assistant Professor of Economic Geology, Louisiana State University; Research Consultant, Louisiana Geological Survey.

It is to be expected that the Axis Powers stored large supplies of petroleum products before the war began. German imports of such vital minerals as copper, manganese, bauxite and iron ore are known to have increased from 190% for copper to 535% for iron ore between 1932 and 1938. Figures on oil imports are not available but must have been correspondingly large.

In summary, the oil situation of the Axis Powers is uncertain but enough is known to make it unwise to hope for an early collapse due to petroleum shortage. If the uncertain factors of storage, Russian imports and synthetic production are all favorable to the Axis Powers, the war might continue indefinitely so far as oil supply is the determining factor.

NATIONAL DEFENSE

The supply of certain mineral raw materials may prove to be the ultimate "bottle neck" of national defense. The mass production of planes, tanks and munitions is wholly dependent on adequate supply of a long list of minerals. Some of these minerals such as iron must be available in large amounts whereas others such as manganese are needed in smaller amounts but without them even the iron is worthless.

The War Department has given long and careful study to the problem of mineral raw materials and classifies the required ones into three groups.

Strategic minerals are those minerals essential to the national defense for the supply of which in war dependence must be placed in whole, or in large part, on sources outside of the continental limits of the United States, and for which strict conservation and distribution control measures will be necessary. At present the following minerals constitute the strategic list: aluminum, antimony, chromium, manganese, mercury, mica, nickel, tin, and tungsten.

Critical minerals are those essential to the national defense, the procurement problems of which in war, while difficult, are less serious than those of strategic minerals, because they can either be domestically produced or obtained in more adequate quantities or have a lesser degree of essentiality, and for which some degree of conservation and distribution control will be necessary. The list of critical minerals is as follows: asbestos, calmium, cryolite, fluorspar, graphite, iodine, platinum, titanium, and vanadium.

Essential minerals are those which are essential to the national defense, for which no procurement problems in war are anticipated, but whose status is such as to require constant surveillance because future developments may necessitate reclassification as strategic or critical. The list of essential minerals is long and includes the following: abrasives, arsenic, chlorine, copper, helium, iron and steel, lead, magnesium, molybdenum, nitrates, petroleum phosphates, potash, refractories, sulphur, uranium, zinc, and zirconium.

Space does not permit the consideration here of the problems relating to the essential or critical minerals. Our attention will be devoted to the particular situation which applies to each of the strategic minerals with some consideration of the immediate and long-term solution to these problems.

STRATEGIC MINERALS

ALUMINUM, *the light metal* which also has the additional qualities of high strength, resistance to chemical corrosion and ease of alloying with a number of other metals, has become a leading industrial metal. The many uses of aluminum and its alloys are well known and do not need to be mentioned here. Aluminum has many military uses other than in the structure of airplanes, and most of the military uses require the best grades of new aluminum. This is the real reason for aluminum being on the strategic list because domestic ores may not be capable of supplying the emergency demand for new metal.

France and the United States are the leading producers of aluminum ore (bauxite), together accounting for more than 55 per cent of the world's supply. In spite of the favorable position of the United States in bauxite production, it has been necessary to import about half our supply for several years. These imports have come almost wholly, 98 per cent, from two countries, British and Dutch Guiana, in South America. Ready access to these deposits and others known in South America is not seriously threatened at present and with increased domestic production the aluminum supply for national defense should be adequate. This does not mean that there may not be temporary shortages of fabricated metal in the early days of expanded plane and armament production.

ANTIMONY, mixed with lead, tin, copper and rarely other metals is essential for many purposes such as battery plates, bearing metal, type metal, hardening of bullets and shrapnel balls, and many others. Antimony sulphide is used in shrapnel charges to produce a dense white smoke and in detonating caps of all kinds of shells.

China produces more than 60 percent of the world's antimony with Bolivia and Mexico producing about 10 per cent each. There is a very small production of antimony in the United States mainly as a byproduct of other ores and no ore bodies are known which could supply any appreciable portion of our demands. Prior to 1930 we imported most of our required antimony from China as refined metal, but the subsequent development of domestic smelting capacity has made it possible for us to import ore and thus change the sources of our supply. In 1937, 83 per cent of our imports of antimony were ore, 60 per cent of which came from Mexico and most of the remainder from South America. With increased domestic production and smelting capacity our supply of antimony can be obtained from areas within the Western Hemisphere, at least for a period of several years.

CHROMIUM is known as a ferro-alloy metal which means that mixed with iron it imparts a number of desirable qualities. Best known of the properties of chrom-iron alloys is their resistance to corrosion as demonstrated by "stainless steel" but chromium may also be used to increase the electrical resistance, strength, toughness, and wear resistance of steels, depending on the proportion of chromium used. One familiar use of chromium is in the electroplating of other metals to produce the great variety of chrome-plated decorative parts for automobiles and kitchen appliances.

The United States was the leading producer of chromium until about 1900, although the production was small. In 1937 we produced only 2300 tons which brought our all time total to 290,000 tons, but during the same year we used 556,900 tons or nearly twice our total production. Most of the sources of chromium are outside the Western Hemisphere. Since 1913 we have imported almost half of our supply from Rhodesia and the Union of South Africa. Other sources include New Caledonia, Cuba, Greece, India, and Turkey. If truly "there will always be an England" and a British Empire the principal sources will be available, although the long ocean haul offers abundant peril.

The government is now engaged in an intensive investigation of domestic sources of the strategic minerals under the jurisdiction of the Unted States Geological Survey and the United States Bureau of Mines. One of the most promising discoveries during the first year of this survey was a chromium deposit in Montana and although preliminary reports are favorable, the reserves and production capacity of the deposits are uncertain.

For most of the important uses of chromium there are no known substitutes and without domestic reserves international conditions in the old world could well cause a serious shortage of this important metal.

MANGANESE IS IMPORTANT METAL

MANGANESE, the steel-making metal, is one of the most essential to modern industry. Fourteen pounds of manganese are needed to make a ton of ordinary steel and for some high manganese steels the demand is greater. Less than five per cent of our manganese consumption is used for purposes other than steel making although some minor uses are essential.

The United States has never been an important producer of manganese. During the last war intensive search disclosed that we have hundreds of deposits but all are low grade and under ordinary conditions not minable. In 1938 we produced 25,000 tons of high-grade manganese ore which was less than 10 per cent of the high-grade ore consumed. During the same year we imported 644,000 tons of high-grade ore from the following countries in order of amounts furnished, Russia, Cuba, Gold Coast (Africa), Brazil, and India. During the preceding five years Russia furnished 40 per cent of our imports, the Gold Coast 27 per cent, Cuba, Brazil, and India 11 per cent each. The increased imports from Cuba in 1938 were the result of rising prices and difficulties in obtaining Russian ore.

In the present emergency we may find it difficult to obtain adequate supplies of manganese. Many of our low grade deposits may be worked and such high grade ores as we have must be produced to the limit. Cuban production can be expanded as can that in Brazil and production may be found in other Latin American countries. As in the last war it may be necessary for the steel industry to lower the required manganese content of its raw material below the standard of 78-82 per cent for ferro-manganese and 20 per cent for spiegeleisen. This will allow the use of lower grade ores and reduce the dependence of this country on imports. We should be able to supply the demand during an emergency of reasonable duration by these means but at higher cost both in money and efficiency.

MERCURY, the liquid metal, has a large number of uses essential to industry, although the total amount is small compared with the other metals. The use of mercury in thermometers, barometers and other similar instruments is familiar to everyone. Large quantities of mercury are used in electrical appliances such a mercury vapor lamps, switching devices, and rectifiers. Important military uses include mercurial drugs and pharmaceuticals, and mercury fulminate in detonators in caps for shells.

NATION RANKS THIRD

The United States ranks third as a producer of mercury and since 1913 we have produced about 60 per cent of our total supply. The chief sources of imports since the last war have been Spain, Italy, and Mexico, the latter furnishing almost 7 per cent during that period. In 1937 we imported 1,483,000 pounds, with Italy being the principal source for the first time.

Obviously international conditions may prevent our obtaining mercury from either Italy or Spain the principal sources in the past. Domestic production can be increased as can production in Mexico. In an emergency it might be necessary to curtail some less essential uses such as lamps and mercury boilers thereby assuring adequate supplies for essential needs.

MICA, the only non-metallic mineral on the strategic list at present is used mainly in electrical appliances as an insulating material, although famliar uses such as windows in stove doors, etc., consume large quantities.

For most purposes domestic supplies are adequate for any emergency. One grade, known to the trade as "splittings", which means very thin sheets split by hand labor, has been entirely supplied by imports. These imports come mainly from India and Madagascar where labor is cheap. There is serious doubt that domestic production could supply this specialized and highly essential grade of mica even in an emergency. This is the main reason for mica being on the strategic list.

The recent discovery of "alsifilm", a suitable substitute for mica, made from bentonite, of which we have abundant supplies, offers a possible solution to the demand for ordinary sheet mica if domestic production should prove inadequate.

NICKEL, another of the ferro-alloy metals essential to the steel industry ranks with manganese as a strategic mineral although procurement problems are perhaps less serious. Nickel is almost as essential to the steel industry as is manganese. Many modern steels used in heavy and high speed machinery contain nickel and this metal is also used with chromium to make stainless steel. Nickel is also alloyed with copper, zinc, aluminum, cobalt, titanium and other metals to supply a long list of alloy metals essential to modern industry.

Nickel is almost unique among the essential metals with respect to distribution among the countries of the earth. Even manganese is found in large amounts in at least a half dozen countries but nickel is found in important amounts in only one country and in unimportant amounts in only a few others. The one important deposit of nickel ore is located at Sudbury, Ontario. The Sudbury district produced 95,514 tons of nickel in 1938 which is 85 per cent of the world production of 112,000 tons. The United States produced only 377 tons obtained as a by-product of copper refining in the same year. In 1938, the last year for which figures are available, we imported 7314 tons of nickel, 21,938 tons of nickel alloys in which nickel was the principal metal, and smaller amounts of nickel oxide and manufactured nickel products.

TIN ALSO IMPORTANT METAL

The United States is fortunate that the great supply of nickel is located on this continent and within a friendly country. Obviously the strategic position of this metal does not present the problems found in respect of others.

TIN, the white metal, is at least as essential as any other mineral on the strategic list. Most of the uses of tin are familiar to everyone, especially tin-plated products such as tin cans and kitchen ware. This is the principal use of tin, but minor uses such as foil and as an alloy in bronze and bearing metal are important. For most uses of tin there is no substitute although glass containers for food and aluminum foil and alloys may relieve the demand somewhat.

The leading tin producing countries in order of importance are Malaya, Bolivia, Dutch East Indies, Siam, China, and Nigeria. The United States has mined some since 1900 the total production through 1938 being 1450 tons. Our principal deposits are in Alaska and the 1940 production there was only 46 tons.

In 1937 we imported 68,000 tons or more than 40 per cent of the world output and recovered 27,000 tons of secondary tin. Our imports came from the following countries, in order of importance: Malaya, China, England (refined Malayan tin), Dutch East Indies, and Holland (refined East Indian tin).

The supply of tin utilized during peace time is remote and at present threatened by international complications. In the present emergency it may be necessary or desirable to substitute other sources. Bolivia, the world's second largest producer, is located where war time interruption of imports would be less likely. Bolivian tin must be imported as ore due to the lack of smelters in that country. This means that we will have to provide domestic smelting capacity and plans are already underway to do this. Bolivian production in 1938 was only 25,000 tons, and without greatly increased production this source could not supply our expanding demand.

With Pacific sources closed we would have to enforce strict control of the use of tin for less essential purposes in order to meet the essential demand with Bolivian and secondary tin. Some uses which could be classed as "less" essential would include tin cans for motor oil and domestic food supplies and tin foil used in wrapping foods, etc. Another control measure would be to insure the maximum recovery of secondary tin.

TUNGSTEN, the last of the ferro-alloy group on the strategic list, is another mineral produced mainly in the Far East. Tungsten is used in steel to produce extra-hard cutting tools, for the manufacture of valves and valve seats for combustion engines, and for hard steels for cutlery blades. Alloys of tungsten with metals other than iron are used in small amounts for special purposes. Tungsten carbide is an exceedingly hard material used as a cutting tool for machine work. One very essential use of tungsten is in the manufacture of filaments for electric light bulbs. Although this latter use of tungsten accounts for less than two per cent of the annual consumption, its importance can not be over stated.

The leading producing countries in order of importance are China, Burma, United States, Bolivia, and Malaya. Before the last war we produced 40 per cent of our demand and during the war 1917-1918 this production was raised to 70 per cent of our requirements. In 1922 production dropped almost to extinction but the application of a tariff to imports made it possible to produce domestic ores on an even larger scale than before. In 1924, production amounted to 75 per cent of our requirements, but by 1929 increased use caused the domestic production to equal only 11 per cent of the demand. Since 1933, production has exceeded the demand and we have had a small exportable surplus.

Tungsten is on the strategic list because the present domestic industry is artificial in that it is possible only with protective tariff. This policy has encouraged the depletion of our reserves, even of low-grade ore, and leaves us unprepared in both reserves and producing capacity for a major emergency. Not the least of the evils of the tariff policy has been the high price thus maintained. The consumer has paid from 50 to 75 cents a pound extra for tungsten in order to maintain a domestic industry otherwise impossible and at the same time encouraged the exploitation of an essential mineral reserve.

The present strategic mineral investigation mentioned above has during 1940 studied the reserve of tungsten ore in new districts in California and Nevada. Reports indicate that with imports from Bolivia and other Latin American countries we should be able to supply the demand during an emergency of reasonable length.

IMPORTANT FOURTEEN POINTS

The summary for each of the strategic minerals given above presents the general procurement problem and appraises the immediate prospects for supplying our demands. Measures to provide for the conservation and supply of strategic minerals have been proposed by many individuals and scientific and military groups. The more practical of these have recently been presented in summary by Mr. G. A. Roush in his book "Strategic Mineral Supplies." The following "Fourteen Points" are taken from that source.

1. *"Build up an increased peace-time production where this is possible and feasible."* For the strategic minerals this measure is impractical either because reserves do not exist, i.e. tin and nickel, or because peace-time prolustion would only serve to deplete such small reserves as do exist.
2. *"Where necessary, conserve the existing reserves by restricting current production."* This applies especially to manganese, mercury, and tungsten, all of which are produced domestically under protection of a tariff. Production could be lowered to any desired level by adjusting the tariff during peace time.
3. *"Build up increased reserves of metal in current uses, from which it can be diverted in time of emergency, if necessary."* Aluminum and nickel pots and pans constitute a very large supply of these metals which could be called for in emergency for more essential defense purposes.
4. *"Encourage as extensive a recovery of secondary metals as is commercially feasible."* The amount of tin, aluminum and other strategic metals which go into junk heaps each year would add greatly to our supply in an emergency. It is not economical to recover these metals once they have reached the dump heap.
5. *"Encourage the accumulation and filing, by the proper agencies, of all available information on foreign sources of supply, and channels through which the products are obtainable."* It would be especially desirable to have detailed information on all possible sources in the western hemisphere, but world-wide information would be insurance against any eventuality.
6. *"Encourage the accumulation and filing, by the proper agencies, of all available information on deposits of strategic minerals in the country."* Much of this information is available in scattered sources, including both federal and state agencies. It should be accumulated in the most usable form by some central agency.
7. *"Stock an emergency supply, sufficient to cover the needs for one or two years."* This plan has been suggested over and over again and at present is receiving favorable consideration by Congress. It is highly practical but requires a large capital outlay with no prospects for return except in an emergency. In order to insure the maximum benefits from such emergency stocks they should consist of high-grade foreign products.
8. *"Conserve the existing supply by restricting use in non-essential lines."* During an emergency the government should restrict the use of aluminum and tin for household utensils and the use of other strategic minerals for similar non-essential purposes.
9. *"Develop substitutes where possible and practicable."* Substitutes for some of the strategic minerals in some of their uses have been found as indicated above. Research leading toward more substitutes should be encouraged and the use of substitutes wherever possible, required in times of emergency.
10. *"Increase the normal output as rapidly as possible after the origin of an emergency."* If some nominal development of domestic supplies is maintained during peace time it will be easy to step-up production with a minimum loss of time. Constant precautions must be taken to see that the best reserves are ready for expanded production.
11. *"Foster production in and importation from available foreign sources, and restrict exportation of domestic products."* This measure would favor Pan-Americanism in that the most available foreign sources would be in the Western Hemisphere. In general, however, this should be tempered with a certain wide distribution of sources as no one knows where political complication may next arise. The exportation of finished products should be restricted in times of emergency, unless such exportation is in the best interest of the country. In peace time the exportation of finished products made from imported raw materials is simply a necessary result of the industrial development of the country.
12. *"Establish control of production, distribution, and prices."* Plans should be fully made in advance to control all aspects of all raw material industries in emergency. This means not only plans for "M" day but for any emergency either limited or complete with the degree of control tempered by the degree of emergency.
13. *"Plan against the possibility of loss of domestic supply through invasion, sabotage, et cetera."* Ore deposits of the essential minerals are located where nature put them and can not be moved. Unfortunately many of the strategic mineral deposits are in the mountainous areas near our coasts. The mines must be located in danger

[Turn to Page 52]

Geophysical Instruments - - - the Magnetometer

by
Max Hoyer[*]

The oldest of all geophysical methods used for prospecting is the magnetic method. This method is based on the fact that certain metallic minerals are much more magnetic than most rock masses and, applied to oil exploration, that most rock masses and formations are faintly magnetic in different degrees.

The magnetometer has to be classified according to its different uses. The best of all known magnetic instruments is the compass. A compass needle supported in such a way that it may rotate in a horizontal plane will take a position parallel to lines of force of the earth magnetic field and will measure the magnetic declination, i. e., the angel between the astronomic meridian or true north pole and the magnetic meridian or magnetic north pole.

There is a variety of instruments which are used in magnetic surveys and which have been developed in the last two decades. We are not concerned about the sensitive instruments used by the U. S. Coast and Geodetic Survey in determining the absolute values of the different earth magnetic fields but only with the instruments used in prospecting by the mining and oil fraternity.

The forerunner of the present magnetometer used in prospecting for ore is the dip needle or inclinometer. The dip needle was in use in Sweden and the Lake Superior ore region decades ago and at the present time is still a useful tool to the mining engineer. But even in its present perfection it remains a tool which is not sensitive enough to register magnetic anomalies of small intensity. For the oil industry only two modern instruments have gained some kind of recognition. The two instruments are called the horizontal and vertical magnetometer. The best known types of these instruments were developed by Prof. Ad Schmidt.

According to C. A. Heiland, Professor of Geophysics, Colorado School of Mines, in "Lectures on Magnetic Prospecting", the applications of the horizontal and vertical magnetometer may be grouped as follows:

1. Location of old crystalline massives
2. Location of anticlines, when
    - (a) The crystalline basement rock exhibits a corresponding depression
    - (b) Magnetic formations (iron conglomerates and igneous covering beds) are included
3. Location of faults, when
    - (a) The crystalline primitive rock is also faulted
    - (b) Magnetic formations (such as for example 2(b)) are also included
    - (c) The fissure of the fault is filled with intrusive material
    - (d) Two formations of different magnetic susceptibility meet
4. Location of intrusion, veins and zones of contact, road and building material and mineral accumulations
5. Location of iron ore
6. Location of non-magnetic ores when in association with magnetite or pyrihotite
7. Location of rare metals, principally gold, in alluvial deposits when the deposits contain magnetite
8. Location of salt domes, provided there is magnetic contrast, particularly in glacial regions
9. Location of meteorites
10. Location of buried iron objects, pipe lines and ammunition.

When the magnetometer became associated with the petroleum industry, approximately 20 years ago, it was welcomed with open arms. The inexpensive and seemingly easy and fast field work of the magnetic method compared to the costly and laborious work of other geophysical methods made it a preferred instrument.

In the few years after introduction of the magnetometer hundreds of instruments were in use in this country. In many cases the work was gratifying, but in most cases it has proven disappointing.

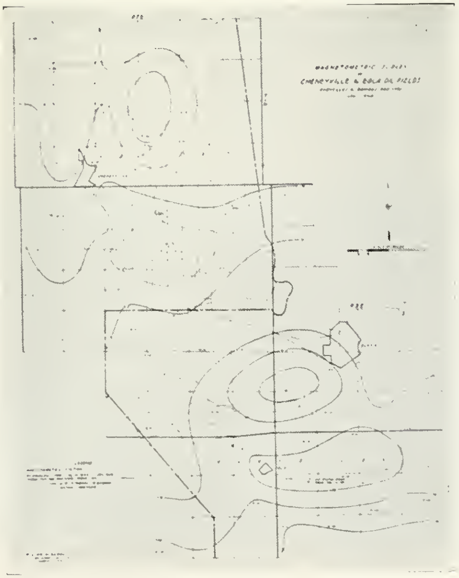

Fig. 1
Courtesy
W. M. Barret
Shreveport, La.

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[*] Geophysical engineer, Division of Oysters and Water Bottoms.

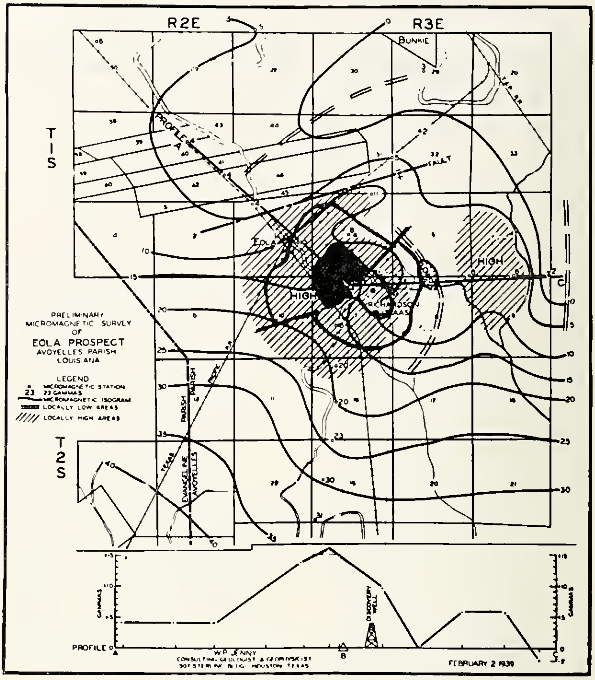
Many errors assigned to the magnetometer were in reality caused by the lack of ability of the operators, even of the most conscientious ones. It appears that after a few lessons a graduate high school boy could be entrusted with it. But ninety-five percent (95%) of the ventures were doomed to failure before the beginning of the operation, not because of inconsistencies or defects of the magnetometer but due to the frequent absence of technical training on the part of the various groups directing and conducting the operations. If the seismograph and torsion balance had been subjected to the same inconsistent procedure, these instruments would have received the same unjustified criticisms.

A far-flung search for magnetic "highs" started. Field results were interpreted in fantastic contours and "highs" were created with the sweep of a contour pen. Wholesale leasing and drilling started on these elusive highs which were not there where the map showed them. Despair took the place of confidence and a search for an alibi started. The magnetometer was elected as the "goat".

Lately, a renewed interest in the magnetic method of geophysical prospecting has occurred due to the following factors:

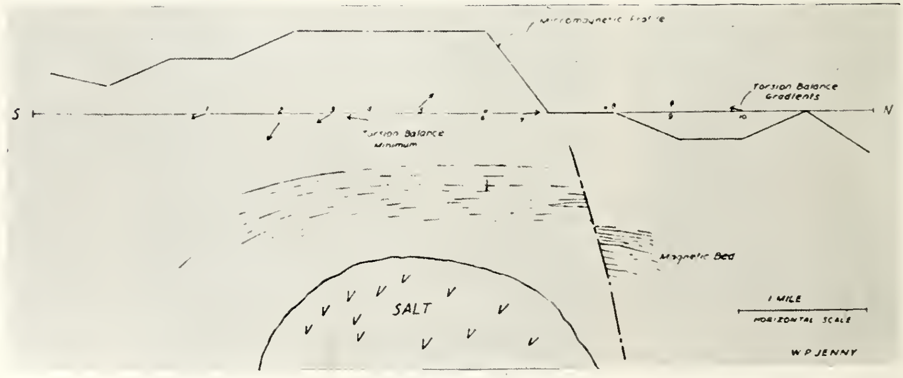
1. The great improvement of the instrument
2. A more thorough understanding of the geological problems involved in the interpretations of the magnetic anomalies
3. That by proper approach the magnetic methods will yield new prospects in regions previously surveyed by the gravimetric or seismic methods.

Without any question, the magnetometer is still one of the most sensitive of geophysical instruments. Reliable and economical, it yet could be developed into one of the best instruments for geophysical work if the performance of the instrument and its results were completely understood and interpreted. Comparatively few geophysicists have made earnest efforts to exonerate the magnetometer. Among the men who published results of their magnetic investigations, Dr. W. P. Jenny, Houston, Texas, and W. W. Barret, Shreveport, La., are the best known scientists who continued experimenting and working with the magnetometer in oil prospecting and whose interpretations have given the best results.



■ **Fig. 2**

(*Courtesy W. P. Jenny, Houston, Texas.*)



■ **Fig. 3**

(*Courtesy W. P. Jenny, Houston, Texas.*)

In 1939, W. M. Barret made a semi-regional magnetometric survey of Cheneyville and Eola Oil Fields (Fig. 1) which shows that the magnetometric method may be well suited to find anticlinal structures in the Wilcox-Sparta area. Mr. Barret wrote in the Oil Weekly, May 15, 1939: "Two factors account for its suitability. First, with properly organized field crews, the method is inherently adapted to covering large areas rapidly and at comparatively low cost, and Second, the Sparta-Wilcox trend is technically suited to magnetics. This for the following reasons:

1. The surface materials which cover the trend are but feebly magnetic, and hence do not disturb or obscure the magnetic effects arising at depth.
2. The magnetizable basement rocks lie at such great depth in the trend that their magnetic reflection will not interfere with the anomalies traceable to folding in the sedimentary section.
3. The Wilcox section is the shallowest lithologic unit encountered in the trend which carries appreciable quantities of magnetic material, and because of its magnetizable properties and great thickness, the principal magnetic anomalies of local areal extent observed in the trend probably will be due to folding in the Wilcox area.

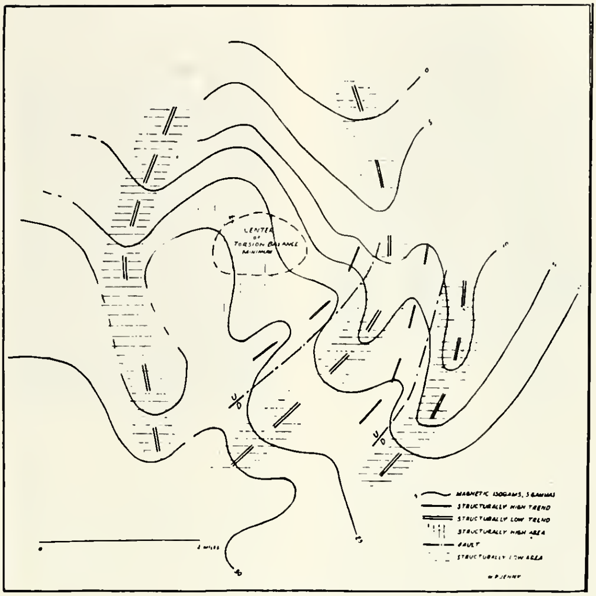
This set of conditions should result in a definite magnetic reflection of Wilcox structures. Experience indicates that it does.

As an example of the "type" anomaly caused by two well-known structures in the Sparta-Wilcox trend, consider the accompanying map which illustrates the results of one form of magnetometric survey carried out over the Cheneyville and Eola oil fields. The contours show how the anomalous vertical intensity varies throughout the area covered.

It is seen that in both the Cheneyville and Eola fields the present oil-producing areas are embraced by closed contours which represent magnetic "highs" or maxima and that displaced northward from these maxima there appear closed contours indicating magnetic "lows" or minima.

It is believed probable that pronounced Wilcox structures, similar to those at Cheneyville and Eola, will give rise to diagnostic magnetic anomalies of the type shown.

The vertical intensity suggests that in the Cheneyville field the structural deformation in the Wilcox persists over a much larger area than indicated by the present oil production from the steeply folded Cockfield formation which is known to overlie a salt mass (perhaps a saltspline that penetrated the southward portion of the elevated Wilcox area)



■ **Fig. 4**

(Courtesy W. P. Jenny, Houston, Texas.)

A more detailed magnetic survey of the same area was made by W. J. Jenny in February, 1939 (Fig. 2). At the time of the survey only the discovery well had been drilled. The results of later drilling are shown in black on this map.

The top of the structure coincides exactly with the magnetically predicted axis, as shown by its projection to the micromagnetic profile A—B—C. The edges of the structure coincide well with the magnetically predicted boundaries and differ only slightly in the southwestern part of the field. Even a small reversal, as shown in the eastern portion of the profile, is indicated by the dry hole in Sec. 4. The 100-foot fault crossing the structure could not be discovered by such a preliminary survey.

The experience at Eola and other Sparta-Wilcox structures seems to indicate that the structural uplift, while well expressed in the Wilcox, does only silghtly affect the Cockfield and younger strata. The close agreement between the Wilcox and the micro-magnetic prediction seems therefore to prove that the magnetic anomaly is the result of magnetic beds of Wilcox or lower Eocene age.

The value and accuracy of a magnetimetric profile compared to a torsion balance is shown in Figs. 3 and 4. Both surveys were by Dr. W. P. Jenny and published in the "Oil Weekly" April 27, 1936

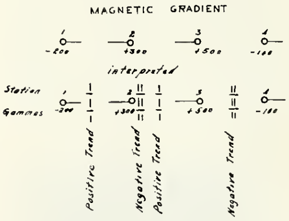
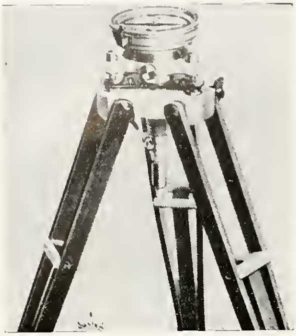


Fig 5

Fig. 3 shows a north-south micromagnetic profile across a torsion-balance prospect in the Gulf Coast. The magnetic profile at torsion balance station 7 clearly indicates a sudden break, which must be interpreted as a fault. This fault is supported by the reversed gradient at station 8.

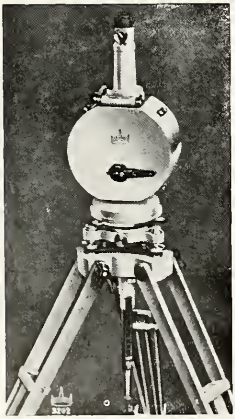
Fig. 4 shows the micromagnetic isograms on another torsion-balance prospect in the Gulf Coast. The area which is interpreted as structurally high from the magnetic data coincides fairly well with the torsion-balance minimum and the swing of the magnetically indicated depressions around the minimum strongly suggests a rim syncline.



■ **Fig. 6. Tripod with compass.**
(Courtesy American Askania Corp., Houston, Texas.)

The surveys were made with a vertical magnetometer sometimes supported by a horizontal magnetometer. The successes were due partially to the new type of instrument which has been greatly improved and partially to the improvement in the operation in the field. It is possible today to measure a magnetic field with an accuracy of about plus or minus 2 gammas as compared with a former average of about plus or minus 20 gammas.

Most of the credit for improvement of the interpretation of magnetic results is due to the fact that the old assumption that results obtained with the magnetometer were caused only by the basement rocks was discarded. Today we know that there exists a big enough difference in the magnetic susceptibility within the sedimentary columns to produce noticeable magnetic anomalies.



■ **Fig. 7**
(Courtesy American Askania Corp., Houston, Texas.)

In the interpretation of magnetic anomalies a knowledge of regional geological conditions is essential. The following conditions may exist:

1. Regions, where the main magnetic effect is due to the basement complex (West Texas, New Mexico)
2. Regions, where the main magnetic effect is due to magnetic beds within the sedimentary column (Gulf Coast area, California valley)
3. Regions, where magnetic effects from within the sedimentary column are super-imposed upon the magnetic effect of the basement complex (Oklahoma, Michigan)

A knowledge of regional conditions can be gained by computing a gradient map from the U.S.C. & G. survey data.

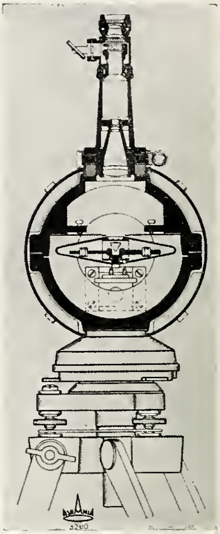
A simple form of interpretation of a micro-magnetic gradient map, revealing magnetic information, is given in Fig. 5. A black station point indicates a positive magnetic anomaly, a circle a negative anomaly. The arrow indicates the direction of the horizontal local force which is always directed toward a magnetic maximum. The figure below the station number indicates the intensity of the locally anomalous vertical component.

Fig. 5 illustrates that the gradients point away from magnetic negative trends and toward positive trends. Between stations 3 and 2 a negative and positive trend must occur, because at station 3 a positive anomaly of 500 gammas exists and the gradient points toward a still stronger anomaly farther west; inasmuch as at station 2 a positive anomaly of only 300 gammas exists; and, since the gradient points toward a stronger anomaly between stations 1 and 2, the gradients of stations 2 and 3 cannot be associated with the same positive anomaly, but must be separated by a negative trend.

There are naturally many other factors to be considered for the interpretation of a magnetic map such as displacement between structure and its magnetic anomaly, distortion of the picture due to the horizontal element in the inducing earth magnetic field, thickening and thinning of the magnetic beds.

Considerable difficulties are experienced by the usual geophysical methods along the Sparta-Wilcox trend of Texas and Louisiana. The very definite results of the micro-magnetic method on the Eola structure (Fig. 2) and the accurate vertical coincidence of the micro-magnetic anomaly (see profile) with the later drilled up structure, hold out justified hopes that the micro-magnetic method may offer the proper geophysical approach to locate and outline commercial structures along this trend.

The magnetic vertical and horizontal field balances are simple instruments. The tripod (Fig. 6) with extensible legs has a tripod head on which is a turn-table for supporting the compass or the field balance.



■ **Fig. 8. Field balance in section.**
(Courtesy American Askania Corp., Houston, Texas.)

The auxiliary magnets which are used for increasing the range of the instrument are carried in a threaded case and screwed into the tube attached to the tripod head vertically below. See auxiliary magnet in place in Fig. 7 which shows a field balance on tripod.

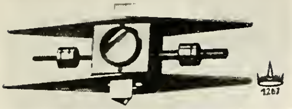
The compass (Fig. 6) is employed for finding the magnetic meridian at each station.

Fig. 8 shows a field balance in section. The field balance is provided with a duofold casing, lined with thick cork slabs as a protection against temperature fluctuations in the interior. The new magnet systems for Askania instruments require no corrections for temperature variations.

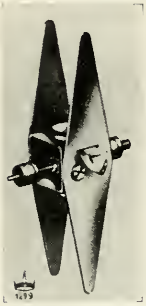
The reading telescope with adjustable cross-levels is secured to the cover of the inner casing. These levels help to insure that the entire instrument is set up perpendicularly with the necessary accuracy.

Within the inner casing of the instrument are two cylindrical quartz bearings on which the magnetic system oscillates prior to making a measurement.

Figs. 10 and 11 show the vertical and horizontal magnetic systems, respectively. The magnetic system comprises a cube-shaped piece of iron tube carrying



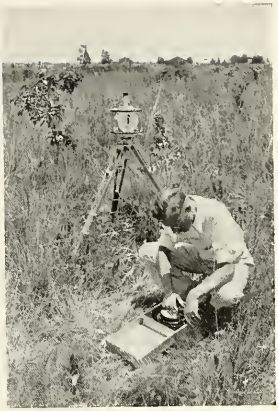
■ Fig. 10
Vertical magnetic system.



■ Fig. 11
Horizontal magnetic system.

a mirror on its upper face. To the lateral faces of this iron tube and parallel with each other are fixed two hardened, magnetized and gold-plated steel lamellae, properly aged, having equal magnetic intensity. The quartz knife-edge passes centrally through the lamellae and the iron cube, its lateral faces being ground to fit against the iron center piece. The projections from the two holes of the tube are metal spindles of different materials, on which small weights of brass are adjustably mounted. These spindles with their weights, which latter can be locked in position, enable the magnetic system to be adjusted to any desired intensity and they also serve to compensate the system for temperature effects. On the underside of the iron center piece is fitted a peg having a bronze weight with central locking device. By means of this weight it is possible, within certain limits, to vary the sensitivity of the magnetic system to suit the task at hand.

Fig. 12, a magnometer in the field. The field balance with necessary accessories weighs 14 pounds. This is the tool with which the magnometer operator has to work. In comparison with other geophysical methods, it is inexpensive and fast but reliable. A layman will shake his head in disbelief when looking at this simple instrument, if told what it will do and can do, if a competent operator stands behind it. For the past several months, the play in the Wilcox-Sparta area is on. Two major oil companies again are experimenting with magnetic crews. Therefore, let us hope that at this time the magnetometer will regain its rightful place as a recognized major geophysical instrument.



■ Fig. 12
(Courtesy American Askania Corp., Houston, Texas.)

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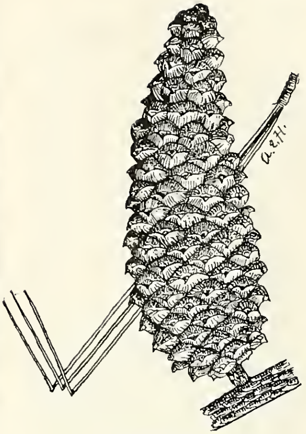
RESEARCH ON INCREASE IN THE NATIONAL PARKS

The national parks are more than just pretty places for picknicking to millions of visitors who utilize the national conservation areas as research laboratories for the study of the natural sciences, it is reported by the National Park Service.

Preliminary statistics for the 1940 travel year show that 193 investigations were made in 26 national park areas by groups of advanced research students, and that more than 7,300,000 individuals delved beneath the surface beauties of the areas to take advantage of the interpretive facilities afforded. The figures indicate that scientific investigators and schools are increasingly using the national parks as research laboratories, a total of 136 distinct organizations, schools, or universities being represented in this classification.

"Rock of Ages," giant stalagmite in Carlsbad Caverns National Park, N. Mex., is 40 feet high.

Trees in Petrified Forest National Monument, Ariz., are not merely turned to stone; they exhibit semiprecious jewels —agate, jasper, onyx, chalcedony.



LONGLEAF PINE

(Pinus palustris Mill.)

(Pine family)

The longleaf pine is distinctive and beautiful; a virgin forest an unforgettable sight. It is an intolerant tree, crowding out all other growth. The trunks are tall and straight, with no branches to a great height, giving to the woods a clean, open look. The young trees are also very attractive, with their large clusters of long, lustrous needles. Mature trees are usually 100 to 130 feet in height, with slightly tapering trunks, often three feet in diameter.

Longleaf pine produces quantities of resin of a high quality. Because of this, and the fact that it grows in pure stands over large areas, it has been the most important of all southern pines to the naval stores industry. Longleaf does not grow as rapidly as loblolly and shortleaf, neither does it reproduce as freely; but where seed-trees were left on cut-over land, where fires were not too frequent, and hogs not too plentiful, there is now a good stand of young trees.

Winn, Grant, La Salle, Natchitoches, Rapides, Vernon, Beauregard, Washington, Tangipahoa, St. Helena, St. Tammany, and Allen Parishes were once largely forested in longleaf; also parts of several other parishes. Pure stands of longleaf occur on sand hills and the heavier soil of level uplands; seldom found growing in clay soils, and never in swamp or floodplains of streams.

The leaves are from 12 to 15 inches long, in clusters of 3 and gathered toward the ends of the thick, scaly twigs.

The flowers, appearing in early spring before the new leaves, are rose-purple. The cones, or burrs, are 6 to 10 inches long.

The Trend of Modern Fish Culture

[Continued from Page 15]

tabulated returns. The cannibalistic habits of game fish, the presence of other predaceous or competitive species, the scarcity of a natural food supply, pollution, diseases, undesirable types of plant life or other conditions detrimental to spawning beds or to the development of the young; either or all may nullify the good deeds of pork barrel politicians, or the well meant calculations of fish culturists of the ancient order.

NEW FISH CULTURE POLICY IS DEVELOPING

As a result of ecological studies of the streams and other waters of the state, a new fish culture policy is emerging. First, as we have learned of no superior species of game fish suited to our climate and waters, we are rearing only our best native species and no foreigners. Plantings are ordered only in suitable waters, and only when overfishing or some temporary adverse condition is the cause of a fish shortage. In most of the back water areas of our large rivers, no plantings are needed, for here it is found that there is a sufficient fish population in proportion to the needs of the human population. Where pollution or other artificial or natural causes have depleted the natural supply, restocking is ordered only after the difficulty is corrected.

We have now abolished the former practice of planting fry and small fingerlings and all fish will be reared at least to advanced fingerling and yearling stages, many to the adult stage, before distribution. In order to achieve these results, the fish hatcheries must be converted into fish farms, by the development of rearing ponds and large finishing ponds. Thus they will serve the multiple purpose of aquatic experiment stations, models for other public and private enterprises, as well being used for restocking waters. In this new development, we are copying from nature, those features most favorable to the production of native pond fishes, using great care not to introduce natural enemies and competitors. For instance, we are using only those aquatic plants which are found growing abundantly in natural waters where pond fishes thrive, yet do not interfere with the management of artificial ponds. In some cases rearing ponds and hatchery ponds are combined, in others the hatchery, or fry ponds, are distinct from the fingerling and finishing ponds, which, however, operate together as a series. In this latter type of rearing station, after a certain age is reached, the small fish are allowed to follow the shoreline and escape through screen gates into another pond where an ample food supply has been developed and where they cannot be molested by the brood stock.

MORE SCIENTIFIC METHODS ARE NECESSARY

Another innovation is that everything that goes into or comes out of a pond is weighed and recorded. First, each pond is properly fertilized. A few days after the water is introduced, water fleas, scuds, shrimp, small species of crawfish, and various minnows are introduced, depending upon the purpose of the pond. These and insect larvae, such as midges and mayflies, develop rapidly in the fertilized water and furnish an abundant food supply for the young fish. In addition to the original fertilization, the ponds are refertilized at convenient intervals. Among the forage fish used are certain top water minnows, shiners, and suckers. Only by rearing food forms of the proper sizes, kinds, and quantities, can cannibalism be reduced to a minimum.

Having learned that Louisiana's early day experiences in fish propagation were costly and of little or no practical value, we believe that we are entering a new era of scientific fish culture. It seems that even rearing stations, although a distinct advance over the older type hatcheries, are not the only thing necessary to produce fish in our waters, and that conditions in the waters themselves must be given careful consideration, as determined by painstaking biological surveys. Studies have shown that the most economical way to restore and maintain an abundant fish fauna is to develop desirable natural conditions not only in the depleted waters, but in adjacent swamps, utilizing to its fullest advantage the procreative ability of the wild fish and of their food organisms, and controlling natural enemies and objectionable plant life. With this thought in mind a number of departures from the beaten path will be undertaken and expenditures recommended for restoring Louisiana's natural areas instead of further increasing the number of rearing stations. Thus, our fisheries, both game and commercial, will be built up at a minimum of cost in proportion to the results to be achieved, and at only a small fraction of the cost of operating culture stations when figured in terms of the increased quantities of fish.

Protect Game and Fish. Wise Conservation pays.

When in New Orleans, don't fail to visit the Louisiana Conservation Museum, now located in the Presbytere Building next to the famous St. Louis Cathedral and across the street from the renowned Jackson Square. You are welcome.

Mineral Resources In War and National Defense

[Continued from Page 46]

zones, but stock piles, refining and fabricating plants can and should be located in safer zones as a safeguard against invasion.

14. *"Employ military and diplomatic strategy to make available sources of supply not otherwise open."* Such measures can not be taken in advance with any assurance that arrangements will be binding when the emergency arrives. During the emergency full knowledge of the production in foreign countries will permit diplomatic and military action with a minimum loss of time. For this reason point 5 above is very important.

SUMMARY

It is a fair conclusion that in the present limited emergency, even with full aid to Britain, we should be able to meet the essential demand for strategic minerals. Conservation and control measures are already being taken in some instances, but these do not affect our everyday affairs. In complete emergency, if it should come after a period of months, we can only hope that adequate suppplies will have been provided or will still be available.

REFERENCES

The following references should be consulted by anyone who is interested in more detailed information on this subject.

Roush, G. A., "Strategic Mineral Supplies", McGraw-Hill, 1939. This is the latest book on the subject and the author is an eminent authority as he has been editor of *The Mineral Industry* for many years. The book contains an exhaustive bibliography.

"The Mineral Industry"—edited by G. A. Roush, McGraw-Hill. This is an annual volume on the statistics, technology and international trade of the mineral industry. The volume for 1939 should appear soon.

"Minerals Yearbook", United States Bureau of Mines, Washington. This is similar to the previous reference and is also published annually.

McBride, R. S., Strategic Minerals and Metals, Eng. and Min. Journal, January 1935.

Emeny, B., "The Strategy of Raw Materials," Macmillan, 1934.

"Mineral Raw Materials", compiled by U. S. Bureau of Mines, Foreign Minerals Division, McGraw-Hill, 1937.

Ecological research during the past two years has resulted in a technical report on alluvial marshes and swamps of Louisiana.

On the Sabine and Lacassine refuges in Louisiana, experimental burning of marshes indicated that fire is an important tool in managing areas for geese. An estimated 500,000 geese were attracted to these refuges after the burning.

Elements of Conservation As Applicable to Louisiana

by
Ambrose Daigre*

Few Louisianians indeed have realized the real significance of the Conservation of our natural resources; and yet a problem so vital as this should receive the attention of every individual of the State. The destruction of valuable natural resources has its gradual ill effects, but even though gradual, they are coming just as certainly as night follows day. The ill effects will have a bearing on every individual whether he is a man of the office, a farmer, a trapper, or a professional man.

In having a true perception of conservation, one must see the entire picture clearly. All things in nature are dependent upon each other. All vegetation is dependent on the top soil. Animals are dependent on vegetation; and we are dependent on both animals and vegetation. Certain insects are considered beneficial because they destroy harmful insects; and insectivorous birds, animals and reptiles are considered beneficial because they also destroy harmful insects. Even predatory animals and birds have their place in nature because they keep other birds and animals from becoming too plentiful. They are also factors in bringing about a survival of the fittest. Nature, in itself, without man, had a natural balance; but man—the thinking animal—has upset the apple cart.

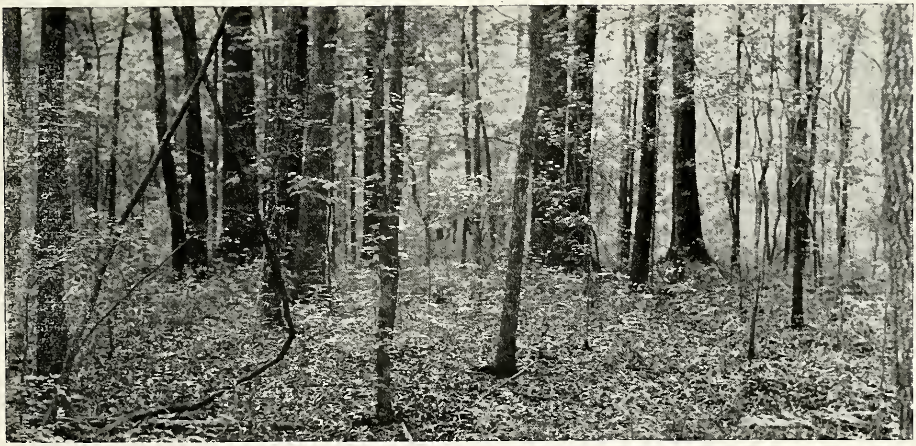
In the very beginning, when this paradise of America was discovered, there was no need for Conservation, or at least so it was believed. There was plenty of timber to protect the top soil; there was a superfluity of animal life—birds, fish, etc.—to furnish a natural free living. Right then and there man started on his destructive course. In a hoggish manner, he began to destroy the timber, and today there is scarcely a tract of virgin timber left in the United States. With the timber gone from the hilly and mountainous sections, erosion was sure to take its toll. Torrential rains and snow and wind and drought soon carried the life-giving top soil to the ocean. There are many places in the United States today where not even a bitter weed will grow. Now I ask you, "What are we going to do when all of the top soil is at the bottom of the ocean?"

The destruction of the forests have had so many ill effects on the country that they are far too numerous to mention. I am only touching the major ones. As, for instance, when land is denuded of forest, the water level in the soil below drops and the land is parched by the sun. The average tree gives off gallons and gallons of water to the atmosphere daily. In short, the cutting of the timber has changed our weather conditions, and has partially caused our flood and drought conditions.

MOST WARS ARE FOUGHT FOR NATURAL RESOURCES

The forests are also the natural home of many species of birds and animals. Destruction of environmental or ecological conditions have been instrumental in depleting many valuable species of wildlife.

Most wars are fought for natural resources. As a matter of fact, the one in Europe today is more or less a war for the acquisition of mineral and food resources. The principal factor leading to the colonization of North America was the rich fur resources. The Hudson Bay Company is an excellent example of this. Furs were shipped to Europe by the shipload.



■ **Our forests are the natural home of many species of birds and animals.**

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* Assistant Museum Director, Department of Conservation.

The passenger pigeons which were once so plentiful that on occasion they darkened the sky, are now extinct. Man, in his usual greed, killed them by the thousand, hauled them to the market by the wagon load, and sold them for five cents apiece! They were even fed to hogs!! Thanks to this wanton waste and ruthless slaughter, there is today not one single Passenger Pigeon left on the face of the globe. This same ruthless slaughter was wrought on our wild waterfowl by the pot hunter; and, **what is worse,** many people in Louisiana today still have no regard for conservation nor the laws pertaining to conservation. It is high time that people realize that there are no more paradises like America—as it was in the old days—to be discovered. What are we going to do when our resources are gone? Shall we just curl up and die?

This article is not intended to discuss such deposits as mineral resources. Minerals are inanimate, and there is not much which can be done to perpetuate them, other than to control the amount that is used. But with forests, birds, reptiles, amphibians, fish, etc., there is much constructive work which can be done if we have a sane and unselfish motive. They are alive and can replenish themselves. All our wildlife needs is just half a chance. Afford them some protection, and restore their natural habitat.

Certain ecological factors control species of wildlife both in number and home range. If, for instance, we desire to increase the Quail population in Louisiana, we must improve and increase Quail habtat. Quail live in certain environmental conditions; and if we do not have these conditions, we do not have any Quail. A typical habitat would be rolling country with considerable cover consisting of patches of woodland, briar patches, and some open field. Food and water are two main factors. Wherever this line of typical country breaks, the birds become fewer in number until there are none at all.

PROPER GAME MANAGEMENT WILL BRING RESULTS

In order to thrive, birds must have protection. This is particularly true during the summer months when the birds are nesting or when they are too young to thoroughly shift for themselves. Farmers should exert every effort to protect nesting Quail. Cutting hay in mid summer certainly plays havoc with birds. Stray cats take a juicy toll of birdlife too. Louisiana has many potential possibilities for upland game. Improve the environment through proper game management and you will see the results.

Now what's wrong with the waterfowl situation in Louisiana, and what can be done to improve it? To be truthful, water fowl is not plentiful any more. The fact that the United States Biological Survey has put restrictions on certain species will prove that. During the winter months Louisiana harbors approximately eighty-five percent of the wild waterfowl of North America;—but there are certainly not enough birds to stage a blitzkreig on the hunters!! There are acres of Blue geese down at the mouth of the Mississippi River, but don't let anyone tell you that those geese are walking away with the muskrat country of Plaquemines Parish. We must remember that those are practically all the Blue Geese of North America in concentration, and try not to destroy them. The Louisiana marshes have an ample number of wild waterfowl refuges, but you will have to prove to me that these contain a superfluity of duck foods. Only a handful of lagoons dotted here and there through the Louisiana Marshes have duck food. You can watch duck concentrations and find the few spots where it abounds. Of course there is a difference with sea ducks. I think they have plenty to eat, but they are certainly few in number. Planting a little duck food in our marshes wouldn't hunt, especially on the preserves reserves.

■ **Conservation education should be started early. Children should be taught to love birds.**

And now for a little pep talk to the hunters and fishermen. Remember, Conservation Laws are not aimed against you, but, on the contrary, they are for your benefit. For instance, if Woodcock get to the verge of extinction, we are going to act in favor of the birds by closing the season. We're not going to keep the season open and see these valuable birds become extinct. You may be deprived of the pleasure of Woodcock shooting for awhile; but, in years to come, there will still be Woodcock for your enjoyment, thanks to a little protection. Without such protection, there would be none. Hunters, as a general rule are sensible about conservation; but there are a few who are inclined to be greedy at the expense of the game. For these particular individuals I say, "Give the Game a Chance!"

WILDLILFE FEDERATION MOVE IN RIGHT DIRECTION

I do not know whether the Louisiana Wildlife Federation's move for conservation in Louisiana was based entirely on interest, or was just a down-right unselfish move; but regardless of the motive, they certainly do deserve a pat on the back for doing a marvelous job of organizing the hunters and fishermen of the State. Now that they have them organized, it is my sincere hope that they will be able to convince them that it is to their benefit to practice conservation. I hope they bring all the boys into the organization—especially the trappers and farmers and commercial fishermen. These are the men of the rural sections, the natural custodians of the game. They can really do something constructive in conservation.

Water pollution is one of our greatest conservatjon problems of today. Pollution kills not only fish by the million, but all aquatic life. Vegetation also suffers—animals can not drink it. As a matter of fact, polluted water is good for absolutely nothing. Even though pollution bills have come before our Louisiana Legislature on any number of occasions, somehow or other no one has been able to introduce a bill with enough teeth to warrant any serious consideration. Oil and paper companies still continue to pour pollution into our streams. It seems that some logical satisfactory solution can be worked out that will not be too harsh to industry. Louisiana needs industry; but industry, at the expense of its natural resources, is not a paying proposition.

EDUCATION AND ENFORCEMENT ARE REAL FACTORS

Real conservation in Louisiana can be brought about through education and enforcement. The quickest and most lasting form of education is visual. Therefore, this Department intends to expend every effort to maintain complete exhibits of the animals, birds, waterfowl, reptiles, etc., in habitat groups. Sound moving pictures on conservation will be of the utmost importance in our educational program.

Conservation laws are fine; but they are absolutely useless unless properly enforced. There are, unfortunately, some people in Louisiana who cannot see the significance of the laws, or, if they did, would not be conscientious enough to obey them. Under the able direction of Mr. Don L. Simon, and his assistants, the Enforcement Division has done an excellent job this past season in forcing these would-be lawbreakers to conform for the good of the whole. If the Enforcement Division keeps at the rate it has been going, this State will soon be able to boast that it has an Enforcement Division equal to that of Pennsylvania—which, as you probably know, ranks first in the United States.

Make a survey, if you will, of the natural resources of the State. Fur, game, animals, game fish, oysters, shrimp, frogs, alligators, fish, forestry, minerals, etc., have served us well for many years. They support many families; they keep the wheels of industry revolving; they bring a great tourist trade to the State. Louisianians have a paradise, if they will only realize it and **conserve it.**

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Protect Game and Fish. Wise Conservation pays.

Over 1,000 Conservation Cases Pending In State Courts of Louisiana

The Division of Enforcement of the Department of Conservation has been one of the most active agencies in Louisiana during the past several months. A total of 1,435 arrests have been made by agents of the Department from June 1, 1940 to February 1, 1941. In addition conservation agents have assisted Federal officers in arresting violators of Federal conservation laws.

Of the 1,435 arrests made, there are 1,003 cases still pending in the various courts in the state. Of the cases that have been tried in the various courts, the score is 385 convictions and 47 acquittals.

With the new 1941 season under way, Chief Enforcement Officer Don L. Simon has announced that strict enforcement would continue on all conservation laws and particularly at this time with reference to the purchase of all types of fishing licenses. February 5th had been set as the time limit for the sale of licenses to coincide with the deadline on the sale of 1941 automobile plates. That doesn't mean, of course, that fishing licenses cannot be obtained after the deadline date, but it does mean that those caught fishing without a license or commercial fishermen conducting business without a license after the time-limit date, will be subject to arrest. Angling licenses, of course, apply only to those who fish with rod and reel.

The Enforcement Division discontinued last year the practice of allowing its agents to sell licenses, and therefore, licenses of all types can only be obtained either from the various sheriffs' offices or direct from the Department of Conservation in New Orleans.

People over the age of 60 are eligible for fishing permits which allows them to fish without purchasing an angling license. This applies only to residents of Louisiana. Permits can be obtained from the sheriff of each parish.

Cases pending on arrests made by conservation agents parish by parish in the state are as follows:

PARISHES	Cases Pending
Acadia	3
Allen	6
Ascension	27
Assumption	3
Avoyelles	31
Beauregard	0
Bienville	4
Bossier	1
Caddo	5
Calcasieu	24
Caldwell	2
Cameron	37
Catahoula	8
Claiborne	10
Concordia	36
De Soto	5
East Baton Rouge	7
East Carroll	6
East Feliciana	6
Evangeline	6
Franklin	7
Grant	3
Iberia	14
Iberville	14
Jackson	3
Jefferson	56
Jefferson Davis	11
Lafayette	17
Lafourche	63
La Salle	24
Lincoln	1
Livingston	20
Madison	7
Morehouse	25
Natchitoches	14
Orleans	18
Ouachita	16
Plaquemines	91
Pointe Coupee	6
Rapides	9
Red River	1
Richland	18
Sabine	3
St. Bernard	67
St. Charles	14
St. Helena	2
St. James	14
St. John the Baptist	22
St. Landry	2
St. Martin	25
St. Mary	2
St. Tammany	48
Tangipahoa	35
Tensas	21
Terrebonne	23
Union	9
Vermilion	4
Vernon	9
Washington	2
Webster	2
West Baton Rouge	15
West Carroll	8
West Feliciana	8
Winn	3
	1003

Resident fishing licenses sell for $1.00. Non-resident fishing licenses are $2.00. Have your license before you go fishing.

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When in New Orleans, don't fail to visit the Louisiana Conservation Museum, now located in the Presbytere Building next to the famous St. Louis Cathedral and across the street from the renowned Jackson Square. You are welcome.

Biology of The Powder-Post Beetles, *Lyctus Planicollis* Leconte and *Lyctus Parallelopipedus* (Melsh.)

Part I

by
M. B. Christian*

For many years the *Lyctus* powder-post beetles have been recognized as serious pests by manufacturers, dealers, and utilizers of hardwood products. A great deal of study has been devoted to their biology and control, both in this country and abroad. (6) It was early observed that the beetles attack only the sapwood of ring-porous woods. In 1916 the manner of oviposition was first described (15)** showing that the beetles laid their eggs only within the open pores or wood vessels. This new biological knowledge threw light on effective methods of preventing attack in non-infested finished seasoned woods by the application of pore fillers, such as shellac, paints, varnishes, etc. (15), (17), (18). More recently it was learned that the food of the larvae of *Lyctus* beetles consists primarily of starch, which is more abundant in the sapwood and appears to be the chief source of attraction of the adult beetles to wood. The knowledge of this fact stimulated intensive research on methods of depleting the starch and thereby rendering the wood unattractive to the beetles, but no practical and satisfactory method of accomplishing this has been reported (11), (12), (13).

It has been demonstrated that all stages of *Lyctus* beetles can be killed by heating the infested material in a saturated atmosphere for a minimum period of 1½ hours after all portions of the wood have reached the fatal temperature of 130° F. (1), (16). This remedy is rather expensive and gives no protection against subsequent reinfestations, and in many cases the beetles may heavily infest the wood before their presence is known. For these reasons, this method of control has not been generally adopted by American manufacturers and exporters of hardwoods.

The control of these beetles in floors, wall panels, and furniture may be accomplished by repeatedly saturating the infested wood with orthodichlorobenzene (17), but due to the volatility of this chemical the protection afforded by this treatment is only temporary.

Another important phase of the problem, namely, the hardwood sawmill operator's problem of preventing attack by *Lyctus* beetles to lumber while air seasoning and in storage on open mill yards, was left unsolved. Because of the hidden habits of the insects, great damage usually occurs before their presence is known. Often export shipments of high-grade lumber, apparently free of these beetles at the time of grading, have arrived abroad badly damaged by the beetles, resulting in rebate claims which have amounted to huge losses to many American manufacturers.

Early in 1936, through the request and with the cooperation of the National Lumber Exporters Association, T. E. Snyder, Senior Entomologist, Forest Insect Investigations, of the Federal Bureau of Entomology and Plant Quarantine, began an investigation with the objective of finding an economical treatment which could be applied in the form of a dip to the green lumber as it came from the saw and would effectively protect it against the attack by *Lyctus* beetles during the seasoning and storage period on the mill yard. This work was continued on part-time basis by the Bureau of Entomology and Plant Quarantine until 1938. These early tests indicated that some of the materials under test were giving effective protection against *Lyctus* beetles (19); however, the results were not considered sufficiently conclusive to justify recommendations for a test on a commercial scale.

In May, 1938, the Chicago Mill and Lumber Company, with the assistance of T. E. Snyder, established a small laboratory on the above company's property at Tallulah, La., with M. B. Christian as a full-time employee to continue the investigation on preventive chemical dips and also to obtain further knowledge regarding the biology of the beetles. Later in the program contributions were received from the various hardwood associations and from chemical companies to assist in the continuance of the studies.

The results obtained from chemical dip tests have been published in the Southern Lumberman (4), (5). The purpose of this article is to record the important and new biological data obtained during the course of these investigations, which information was essential in working out the preventive measures recommended in a previous article (5).

SPECIES INVOLVED

According to Kraus and Hopkins (9), the genus *Lyctus* comprises at least 17 distinct species. Those that have received most attention because of their destructive habit of attacking commercial hardwood products are: *Lyctus planicollis* LeConte, *L. parallelopipedus* (Melsh.), *L. brunneus* Stephens, and *L. linearis* Goeze. The former two beetles appear to be the most common *Lyctus* species in the United States. The original home of *L. brunneus* appears to have been Central and South America, but it now is reported as the most common species in Australia and the British Isles (8). It is possible that *L. brunneus* has become established in Florida. During the course of this investigation a sample of magnolia heavily infested by *L. brunneus* was received by the writer from that state. The native home of *L. linearis* appears to be Western Europe (9) (England, France, and Germany); however, this species has been recorded as occurring in the United States.

With the exception of the specimens of *L. brunneus* received from Florida, only two species of *Lyctus* beetles have been encountered by the writer, namely, *L. parallelopipedus* and *L. planicollis*; thousands of which have been reared in the laboratory from wood collected on mill yards in Louisiana, Mississippi, and Arkansas.

LIFE HISTORY AND HABITS

The life cycle of *Lyctus* beetles is completed in four distinct stages, namely, the egg, the larva, the pupa, and the adult. The beetles lay their eggs within the surface wood pores to a depth of several millimeters and the larvae which hatch from them burrow inside the wood and reduce it to fine powder-like dust. Pupation occurs in the larval tunnels, usually near the surface. A few days after transforming to the adult stage, the beetles cut small, round holes directly to the surface through which they emerge.

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* Conducted under the supervision of Dr. T. E. Snyder, Senior Entomologist, Bureau of Entomology and Plant Quarantine.

** This paper will be published in two parts; the literature cited will appear in Part II, Spring 1941 issue.

The adults feed very scantily on the surface of the wood, mating occurs and the cycle is repeated. The period required for the complete cycle ranges from three months to a year, or longer, depending on the species of *Lyctus* involved, and the condition of the host species of wood, such as starch content, moisture content, and prevailing temperatures.

The general habits of the two species under observation are essentially the same; however, certain differences have been observed which have an important bearing on control methods and which are also helpful in identifying the species involved. These characteristics will be pointed out in the following discussion.

OVIPOSITION

Females of *L. parallelopipedus* insert their eggs into the wood pores to a depth of 1 to 3 mm., while those of *L. planicollis* lay their eggs somewhat deeper, ranging from 4 to 7.5 mm. Because of this fact, certain larval stomach poisons, such as borax, when applied as ten-second hot dips to lumber give effective protection against *L. parallelopipedus*, but such treated wood may become slightly infested by *L. planicollis* (4). The latter beetles may lay some of their eggs in the wood below the point penetrated by the toxic chemical.

As previously reported (15), this peculiar manner of egg laying is accomplished by the female inserting her long ovipositor within the open surface timber pores. When fully extended the ovipositor sometimes approaches in length that of the entire beetle's body, but normally it is almost completely concealed within the abdomen.

THE EGGS

Eggs of *L. parallelopipedus* (fig. 1) are white in color, cylindrical in shape, and measure about .1 mm. in width and .6 mm. in length. They differ from *L. planicollis* eggs (fig. 2) in their smaller size, greater fragility, and by the presence of a slightly sclerotized area on the anterior pole, which is usually in the form of a conical cap, but in some cases may be drawn out into a stubby or even a rather long stem.

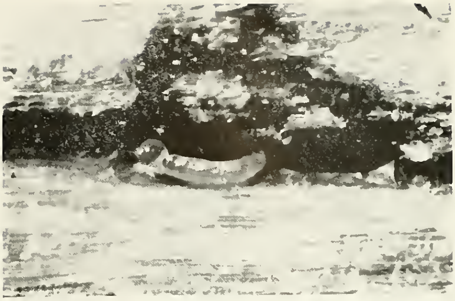


Fig. 1. Egg of *Lyctus parallelopipedus* (Melsh.) enlarged about 50 times.

(By J. G. Pratt.)

It is of special interest to note that most of the eggs of *L. parallelopipedus*, after being laid, closely resemble those dissected by Parkin (10) from the calyces of *L. linearis*, *L. brunneus*, *L. sinenis*, and *L. planicollis*. Parkin's studies indicate that the strand process or tail is formed while the egg is passing through the ovipositor. Why the strand does not always occur on eggs laid by *L. parallelopipedus* has not been determined. As far as the writer has been able to learn, this is the only species within the genus *Lyctus* which has been observed to lay eggs containing a sclerotized area on the chorion and with only a short stem or practically no stem at all. The eggs of *L. parallelopipedus* closely resemble those laid by *Minthea rugicollis* which were briefly described and illustrated by Brown (3) of the Malay Peninsula. However, did not mention the occurrence of a sclerotized area on the eggs of *Minthea rugicollis*. The writer has not seen eggs of this species.

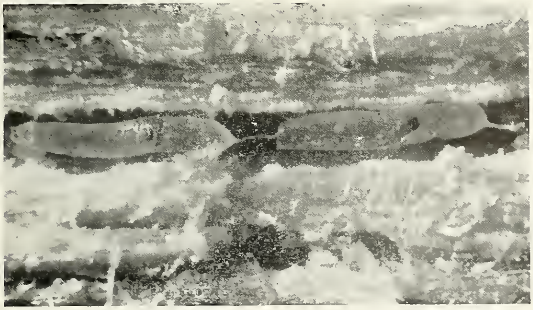


Fig. 2. Egg of *Lyctus planicollis* LeConte enlarged about 50 times.

(By J. G. Pratt.)

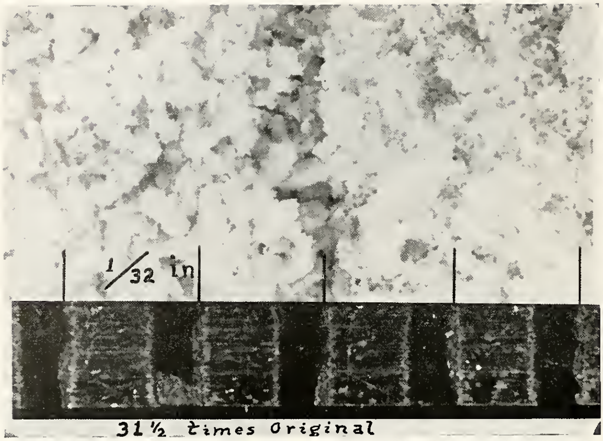
HATCHING OF THE EGGS

Eggs of both the two species of *Lyctus* concerned hatch in 6 to 15 days. The hatching process of *L. planicollis* was described by Snyder (15), and the writer's observations verify this description, in which he stated that "the larva backs out of the egg chorion." The posterior end of the egg shell is ruptured and the young larva works backward through the opening, while feeding on the egg yolk present in the anterior end. When free of the egg shell, the young larva of *L. planicollis* is facing the pore opening in which the mother inserted her ovipositor, and feeding on the vessel wall occurs in this direction for about one or two millimeters; then, the young larva cuts through the vessel wall at a right angle for one or two millimeters, after which the original course is reversed; then, the larva tunnels away from the point of entrance of the mother's ovipositor.

THE LARVAE

The larvae are white in color, with the exception of the dark brown head with brownish to black mandibles, and the body is curved in shape with the foremost part relatively larger than the abdomen. The larvae of *Lyctus* beetles may be readily distinguished from other larval forms of similar wood-boring habits by the presence of an enlarged spiracle on either side of the abdomen near the end of the body (Fig. 4).

At first the burrows or tunnels of the larva are very small, but they increase in size as the grub develops. These tunnels are tightly packed with very fine powder-like dust, which when exposed can be easily displaced by jarring. The texture of the dust associated with the damage is one of the most convenient characters in determining whether the boring in the wood is being caused by *Lyctus* beetles or members of another group of insects of similar habits known as anobiids, or the death-watch or furniture beetles. The



■ **Fig. 3. Frass associated with damage by *Anobium* and *Lyctus* beetles.**
(*By J. H. Roberts.*)

dust produced by the latter beetles is in the form of pellets, which can be readily distinguished from the fine powder associated with damage caused by *Lyctus* beetles by merely rubbing the materials between the thumb and index finger (Fig. 3).

With the exception of the exit hole made by the adult, all the boring is caused by the larvae and in most cases infested wood can not be detected by external examinations[1] until some of the beetles reach maturity and bore their way out.

THE GROWN LARVAE

The grown larvae usually bore near the wood surface (approximately ⅛ inch) where they prepare small cylindrical pupal chambers, in which they change to the pupal stage.

The larval stage covers a period varying from two to nine months, or longer, depending on the species of beetles and the condition of the wood host. Under ideal conditions *L. parallelopipedus* larvae may mature in 60 days; under similar conditions, *L. planicollis* larvae require a much longer period, usually four to nine months.

Usually the grown larvae of *L. planicollis* (Fig. 4) are relatively thicker and somewhat larger than those of *L. parallelopipedus*, and when removed from their tunnels and exposed, their bodies seem to have a more pronouncedly curved shape.

The taxonomic differences in these larvae were determined and illustrated by W. H. Anderson, Division of Insect Identification, Washington, D. C., from cage reared specimens submitted to him by the writer. These distinguishing characteristics are expressed in key form in figure 5, in which A, B and C are *L. parallelopipedus* and D, E, and F are *L. planicollis;* however, these features cannot be seen with the unaided eye.

In the larvae of *Lyctus parallelopipedus* (Melsh.): "Mesothoracic tibiotarsus plus claw two and one-half times as long as claw (A); metathoracic tibiotarsus (minute hyaline claw sometimes present) slender, about four times as long as broad at base (B); outer face of mandible more than three times as long as molar part (C,M)."

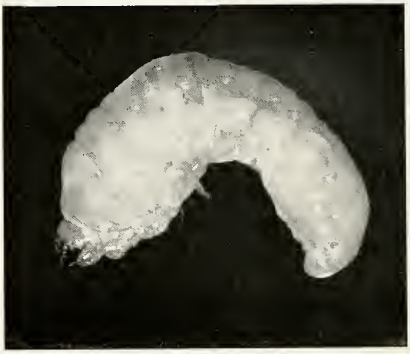
In the larvae of *L. planicollis* LeConte: "Mesothoracic tibiotarsus plus claw about eight times as long as claw (D); metathoracic tibiotarsus (minute hyaline claw sometimes present) more robust, slightly more than twice as long as broad at base (E) outer face of mandible slightly more than twice as long as molar part (F,M)."

THE PUPAE

When the larvae complete the pupal chambers, they remain quiet and undergo a gradual change into the pupal stage. The pupae remain inactive in their cells for a period of 12 days to three weeks, when they transform to the adult beetles. In most cases the adult features are sufficiently apparent in the pupal stage (Fig. 6) to determine the species involved—that is in the case of *L. planicollis* or *L. parallelopipedus.*

THE ADULTS

The beetles remain in the pupal cavities until their bodies become sufficiently hardened, then they commence to bore their way out to the surface. In the process of emerging, dust is usually pushed in front of the body, which is often the first external sign of infestation.



■ **Fig. 4. Larva of *Lyctus planicollis* Lec. greatly enlarged.**
(*By G. H. Lantz.*)

The exit holes are circular in shape and their average diameters vary somewhat with the two species. Those made by *L. parallelopipedus* average about 1 mm. in diameter, while those of the larger species, *L. planicollis*, average slightly less than 2 mm.

The adult beetles (Figs. 7, 8) are small (2 to 6 mm. in length) and somewhat flattened in shape, the latter feature being more pronounced in the *L. planicollis* adults. The average size of *L. parallelopipedus* is less than that of *L. planicollis* and specimens of the smaller species are usually reddish brown in color, while those of *L. planicollis* are usually black or approaching black. In both species, the females are normally larger than the male beetles. There is variation in both size and beetles. There is variation in both size and color within each species, consequently these characters cannot always be relied upon to separate these two species.

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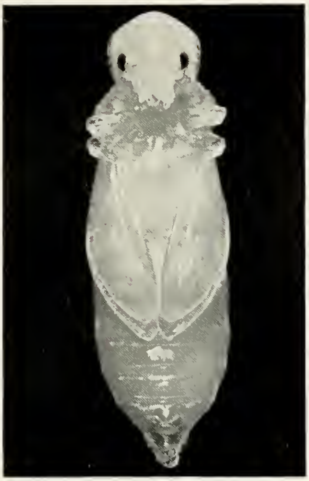
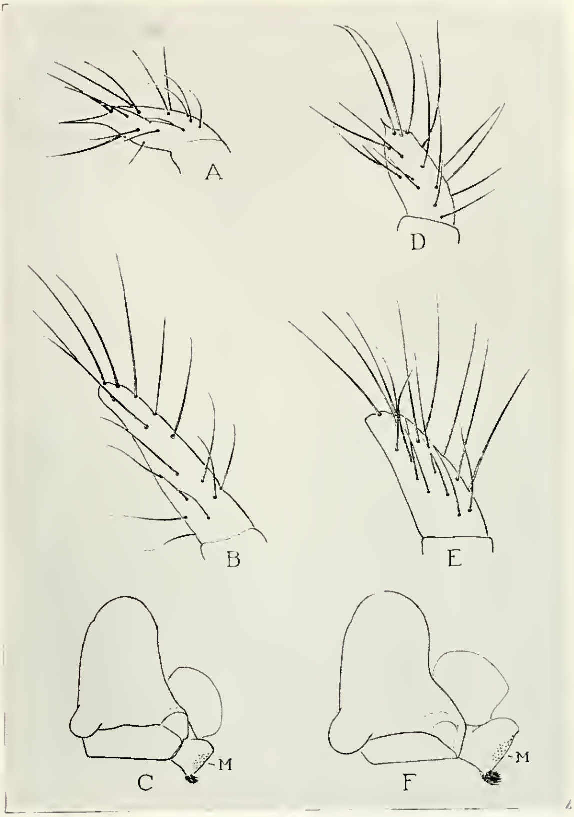
[1] The exit holes of larval braconid wasp-like parasites sometimes permit the fine dust from the larval tunnels of *Lyctus* beetles to filter to the surface, indicating attack on the surface before emergence of adult beetles.



■ **Fig. 6. Pupa of *Lyctus planicollis* Lec.—greatly enlarged.**
(By J. G. Pratt.)

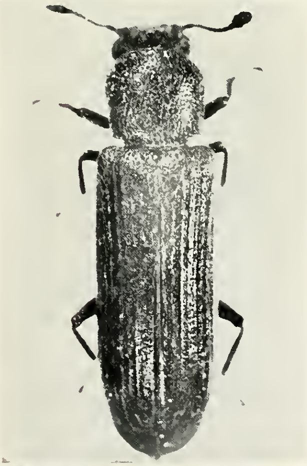


■ **Fig. 5. Distinguishing features in the larvae of the two common American species, *L. parallelopipedus* and *L. planicollis*.** *(Drawings by W. H. Anderson.)*

With the aid of a low-powered lens, the two species of beetles may be easily separated by observing the arrangement of the pubescence or fine hairs present on the wing covers. The pubescence forms straight lines up and down the wing covers of *L. planicollis*, while on the wing covers of *L. parallelopipedus* it is much longer and confused or scattered over the entire surface.

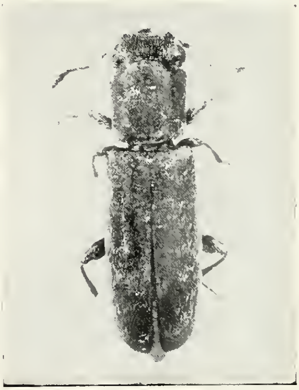
Shortly after emergence, the beetles mate and begin to lay eggs. Counts of the offspring (larvae) of a known number of mother beetles indicate that each female lays about 25 fertile eggs. The beetles are less active during the day, and most of their activities take place beginning at dusk and continue during the night. Adult beetles consume very little wood; their feeding signs after emergence are negligible.

Adults of *L. parallelopipedus* are much more rapid crawlers than members of the larger species, which are almost sluggish in their movements. Both are strong fliers and may travel some distance from their original host. The beetles live about three or four weeks. The longest record of adult life was that of a *L. parallelopipedus*, which lived for 50 days. Generally there appeared to be little difference in the length of adult life of the two species.



■ **Fig. 8. Adult of *Lyctus planicollis* Lec.—greatly enlarged.**
(By G. H. Lantz.)

■ **Fig. 7. Adult of *Lyctus parallelopipedus* (Melsh.) greatly enlarged.**
(By G. H. Lantz.)



The Bat--One of Our Most Interesting Mammals

[Continued from Page 40]

To compensate for slow reproduction, bats are generally long lived, just how long, there seems to be no record, but some of the banding experiments show the same bat captured five years after the initial banding. The author has kept captive bats for nearly three years without apparent aging.

They Know How to Avoid Objects

One of the most remarkable attributes of bats that has puzzled many a person for hundreds, perhaps thousands of years, has been their uncanny ability to avoid objects. Wires strung in absolute darkness will not be touched by flying bats, they will never fly onto a person's head and into the hair. Many theories have been advanced from time to time, only to be discarded upon a little experimentation. The complicated structure of the outer ear, and the glandular growths about the face led to a belief that the ear was, in some way, associated with this uncanny ability.

Several years ago Mr. Donnald Griffin, a student of Harvard University, reported (*Journal of Mammalogy*) that he had been able to detect supersonic notes produced by bats. But he concluded in his report that he doubted whether these were the cause of avoidance of objects. The author wrote to Mr. Griffin that, in his opinion, these notes undoubtedly were the cause of being able to keep away from objects even in complete darkness. At the recent meeting of the American Society of Zoologists in Philadelphia on January 1st, 1941, Mr. Griffin and Robert Galambos also of Harvard University, gave a report on a very careful and complete series of experiments to test the use of supersonic notes by bats.

These supersonic notes were first recorded and then the tone lowered to the audible range of the human ear. Within the human range they sounded like a series of "clacks". The number emitted per second varied from a few (ten to fifteen) up to as many as sixty per second, this frequency depending on the nearness to objects and their state of excitement. Even when at rest and disturbed, they will emit these sounds. The vibration rate of these supersonic notes varies between 50,000 and 60,000 per second, which is well above the limit of human audibility. The human limit is usually stated at about 32,000 per second with exceptional audibility as high as 40,000 vibrations.

Interesting Experiments

The following series of experiments by Griffin and Galambos show conclusively the use of these sounds to avoid objects: The bats were first allowed to fly freely in an absolutely dark, well padded, sound proof room with a set of wires strung from ceiling to floor at intervals of 12 inches across the middle of the room, more or less dividing the room in half. The wires were connected to a recording device which registered every time a wire was touched. Seldom or never were the wires touched and the bats flew freely between them.

Next the bats were blindfolded by sealing opaque cellophane over the eyes. The bats continued to fly freely avoiding the wires and alighting on the walls with ease showing that they were not dependent on sight for normal flight. The next step was to take off the blindfold and seal one ear. This had the effect of hindering their ability to avoid the wires, but did not prevent them from alighting normally on the walls. Both ears were then sealed, and the bats were absolutely helpless in avoiding the wires and were unable to even alight on the padded walls, but would fly into them and fall to the floor. Their avoidance sense was completely destroyed.

Finally, both eyes and ears were left to function normally, but the mouth was sealed shut so that sounds could not be emitted. Again the bats were released in the room and were just as helpless as when the ears were sealed. They could neither avoid the wires nor alight on the walls. Blindfolding with sealed ears or mouth made no difference.

This series of experiments by Griffin and Galambos shows that bats undoubtedly locate their nearness to objects by echos of their own high pitched notes, emitted continuously in flight. The high frequency tone gives an extremely accurate location echo which is not distorted as a low frequency would be. The same principle has been recently followed in using high frequency radio waves. It has solved a mystery that has long puzzled scientists, and gives us one more proof that other unsolved riddles in nature would be simple of explanation if the human senses were only more acute.

When in New Orleans, don't fail to visit the Louisiana Conservation Museum, now located in the Presbytere Building next to the famous St. Louis Cathedral and across the street from the renowned Jackson Square. You are welcome.

The Louisiana Conservation Review wants photographs on wildlife subjects and will appreciate amateur photographers sending in snapshots. Credit will be given for any photographs used in the magazine.

The Bats of Louisiana

[Continued from Page 42]

are often presented with a serious problem of getting rid of them. Probably the most effective method so far found is that of carefully going over the building and closing all entrances which the bats might use. This is often a crack along side a chimney or a missplaced strip of weather boarding. One should locate the places where the bats leave and enter the building. Then wait until the bats have left the building some evening before closing the apertures. Otherwise the dead bats might produce an odor more disagreeable than that suffered before.

Not always is the free-tailed bat in disrepute for in San Antonio, Texas, municipal bat roosts were erected to encourage a high population of the animals. This was done in recognition of their food habits beneficial to man, especially in mosquito control. The practicability of erecting such a structure is open to question.

The free-tailed bat, as the name implies, has a small portion of the tail free from the interfemoral membrane, that part of the flight structure which extends in most bats from the hind foot across to the end of the tail. This species is small and compact in size and is one of the most erratic of all bats in flight. Its black color and the free portion of the tail serve to distinguish it from other forms. In passing it might be noted that the famous bat colony at Carlsbad Cavern is made up to a large extent by bats of this group although they differ somewhat from our Louisiana species.

LAW ENFORCEMENT

(Dedicated to Conservation agents in Southwest Louisiana)

Bateese she's used to hunt de duck
An' all de time he's have good luck
He hunt for market wide an' loose
An' nevair sleep in calaboose.

But time is change and poor Bateese
Kill forty duck and ninteen geese
An' when he start to leave de blind
Someone say "Wait, if you don' mind!"

"Les' see what you got in dat sack
What look so heavy on your back,
An' when he look—Viola!—By gee!—
He say, "You better come wit' me."

"Les' tell de judge about dis t'ing,
An' hear what kind of song he sing."
An' now Bateese he's get his mail
Addressed in care of Federal Jail.

Oil and Gas Wells Completed in South Louisiana During 4th Quarter of 1940

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Gravity	Total Depth
ANSE LA BUTTE (St. Martin Par.)							
	Iberia Pet. Co.	Moresi A-3	9/29/40	135.00	10/64	29.0	2,952
	Iberia Pet. Co.	Martin A-1	10/15/40	43.24	Pumping	20.2	2,214
	Stanolind O. & G. Co.	Celestine Rand #1	10/27/40	337.68	12/64	37.6	4,064
	Glassell & Glassell	Moresi #3	11/5/40	219.00	10/64	37.0	4,662
	Stanolind O. & G. Co.	J. J. Martin B-1	12/1/40	386.40	20/64	31.6	4,850
	Stanolind O. & G. Co.	L. D. Bergeron #2	12/9/40	257.00	10/64	38.8	4,775
BARATARIA (Jefferson Par.)							
	The California Co.	Fleming Plt. A7	11/16/40	275.64	10/64	36.8	8,310
BAYOU BLUE (Iberville Par.)							
	Markley & Crosby Drlg. Co.	Baist Cooperage Co. #5	10/3/40	146.07	16/64	19.0	1,427
	Markley & Crosby Drlg. Co.	Baist Cooperage Co. #1	10/26/40	175.00	16/64	19.0	1,673
	Superior Oil Co.	Schwing Lbr. & S. #5	10/27/40	214.65	9/64	34.7	6,132
	Markley & Crosby Drlg. Co.	Baist Coop. #6	11/10/40	140.00	16/64	19.7	1,577
	Superior Oil Co.	Schwing Lbr. & S. #6	11/26/40	194.00	16/64	34.8	6,448
	Navarro Oil Co.	Wilbert Min. Coop. #1	12/17/40	160.00	24/64	19.8	1,820
	Superior Oil Co.	Schwing Lbr. & S. #7	12/26/40	162.00	9/64	26.5	5,400
BAYOU BOUILLON (St. Martin Par.)							
	Superior Oil Co.	Rycade #3	10/27/40	43.20	Open	23.0	4,690
BAYOU CHOCTAW (Iberville Par.)							
	Louark Prod. Co.	Wilbert Min. Coop. #1	11/16/40	349.02	16/64	25.9	4,197
BAYOU PIGEON (Iberia Par.)							
	Plymouth Oil Co.	State #1	12/5/40	178.00	10/64	35.8	8,140
BAY ST. ELAINE (Terrebonne Par.)							
	The Texas Co.	State-Bay St. Elaine B-5	11/4/40	275.04	8/64	31.6	7,945
CAILLOU ISLAND (Terrebonne Par.)							
	The Texas Co.	State-TB #6	10/17/40	348.96	1/8	35.5	6,768
	The Texas Co.	State-Cl #49	12/22/40	400.00	3/16	35.9	8,037
CHACAHOULA (Lafourche Par.)							
	Sun Oil Co.	(Williams, Inc. "Cypress #2")	10/24/40	16.00-Dist.	9/64	?	9,569
CHALKLEY (Cameron Par.)							
	Humble Oil & Refg. Co.	School Bd. #3	10/13/40	275.40	3/16	37.6	8,650
CHARENTON (St. Mary Par.)							
	Failing Expl. & Drlg.	E. D. Viguerie #1	11/9/40	32.50	Open	20.0	1,140
CHENEYVILLE (Rapides Par.)							
	Amerada Pet. Corp.	Weil Co. Inc. #14	10/24/40	245.00	3/16	46.5	5,715
	Amerada Pet. Corp.	Weil Co. Inc. #15	11/19/40	389.00	3/16	45.0	5,699
	Amerada Pet. Corp.	Weil Co. Inc. #16	12/12/40	275.40	3/16	45.0	5,721
	Amerada Pet. Corp.	Weil Co. Inc. #17	12/31/40	211.44	3/16	44.6	5,721
DARROW (Ascension Par.)							
	Humble O. & R. Co.	S. Gumble #18	10/20/40	97.00	14/64	27.8	5,777
	Humble O. & R. Co.	Humble Comm. #32	11/16/40	227.00	12/64	30.6	4,693
	Humble O. & R. Co.	Hunter Com. #31	12/4/40	129.72	1/8	30.7	4,680
DOG LAKE (Terrebonne Par.)							
	The Texas Co.	LL&E Dog Lake #12	11/4/40	209.28	10/64	32.8	7,800
	The Texas Co.	LL&E Dog Lake #13	12/21/40	178.68	3/16	32.4	7,800
EDGERLY (Calcasieu Par.)							
	Emerson Oil Corp.	Hunter Co. #16	12/19/40	195.00	1/4	19.4	3,640
EOLA (Avoyelles Par.)							
	Amerada Pet. Corp.	H. Beverly #2	10/7/40	343.02	3/16	44.0	8,570
	S. W. Richardson	Haas Inv. "D" #1	12/1/40	324.60	3/16	44.0	8,580
ERATH (Vermilion Par.)							
	Humble O. & R. Co.	School Bd. #1	10/14/40	224.00	3/16	54.3	11,676
FAUSSE POINTE (Iberia Par.)							
	The Texas Co.	State LFP #8	11/11/40	32.40	11/64	29.9	7,954
GARDEN ISLAND BAY (Plaquemines Par.)							
	The Texas Co.	State Grd. Is. Bay #49	11/7/40	176.00	3/16	34.6	5,519
GIBSON (Terrebonne Par.)							
	Shell Oil Co.	Pelican #10	11/18/40	321.60	8/64	38.6	9,513
GOLDEN MEADOW (Lafourche Par.)							
	The Texas Co.	LLE Golden Meadow #14	10/2/40	301.00	9/64	37.7	10,910
	St. Mary Oil Co. Inc.	Chouest Unit 6 #2	10/3/40	162.00	12/64	36.0	5,500
	Mar-Tex Oil Co.	Cochenic #2	10/9/40	90.00	10/64	35.5	5,098
	Pan-Busch Pet. Corp.	P. Collins #1	10/13/40	65.00	10/64	36.0	5,195
	Bateman Drilling Co.	Theodore Collins #2	10/15/40	194.00	10/64	36.0	5,229
	Brownswood Oil Corp.	Hugh Chermie #1	10/15/40	110.00	10/64	36.0	5,501
	The Texas Co.	LL&E GM #15	10/19/40	307.80	10/64	37.2	10,380
	Tippett Oil Corp.	Doucet #2	10/23/40	140.00	9/64	36.0	?
	Frankos & Serice	M. F. Hatcher #1	11/3/40	181.00	10/64	?	5,491
	Tippett Oil Co.	Doucet #1	11/10/40	140.00	8/64	36.0	5,205
	Brownswood Oil Corp.	D&B Cheramie #1	11/20/40	319.00	16/64	36.0	5,225
	Bateman Drilling Co.	B. J. Collins #1	11/22/40	48.60	6/64	36.0	5,614
	Frankos, Manakos & Sakkis	Arame Collins #1	12/7/40	118.00	10/64	36.0	5,503
	Jim McMurray Prod. Co.	Daize Cheramie #1	12/7/40	108.00	10/64	36.0	5,496
	Superfine Oil Syndicate	Mrs. Andres Martin #1	12/18/40	194.00	10/64	36.0	5,488
	The Texas Co.	State Catfish Lake #10	12/19/40	105.30	12/64	26.8	2,688
	Bateman Drilling Co.	B. J. Collins #2	12/23/40	180.00	10/64	36.0	5,213
	Frankos, Manakos & Sakkis	Arame Collins #2	12/28/40	129.60	10/64	36.6	5,171
	McMurray Production Co.	Collins Community #3	12/28/40	105.30	7/64	36.4	5,486
	Brownswood Oil Corp.	D&B Cheramie #2	12/30/40	108.00	8/64	36.6	5,503
GRAND BAY (Plaquemines Par.)							
	Gulf Rfg. Co.	La. State QQ #11	10/10/40	648.00	1/4	34.7	8,556
	Gulf Rfg. Co.	G.P.L.D. A-8	10/31/40	432.00	3/16	37.8	10,004
	Gulf Rfg. Co.	La. State QQ #5	11/21/40	504.00	3/16	36.2	8,770
GUEYDAN (Vermilion Par.)							
	Fobs Oil Co.	Mulvey Irrg. Co. #1	10/29/40	22.77	14/64	48.0	9,661

Oil and Gas Wells Completed in South Louisiana During 4th Quarter of 1940

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Gravity	Total Depth
HAPPYTOWN (St. Martin Par.)	Shell Oil Co.	Iberville Land Co. #2	11/30/40	324.00	10/64	38.8	10,900
IBERIA (Iberia Par.)	Lisbon-Iberia Oil Corp.	Gulf Fee #11	10/9/40	291.60	12/64	30.0	6,384
	William Helis	Bullock A #2	10/14/40	196.04	10/64	26.4	3,765
	The Texas Co.	J. P. Duhe #19	10/18/40	324.00	11/64	32.3	7,788
	The Texas Co.	Albert Decuir #2	10/22/40	403.00	12/64	33.9	6,471
	The Texas Co.	V. J. Smith #3	11/18/40	243.10	16/64	32.4	7,193
	William Helis	Bolivar #13	11/21/40	64.80	10/64	23.9	3,682
	William Helis	Bullock #A3	11/22/40	446.88	1/4	32.9	6,256
	William Helis	Bullock #A4	11/28/40	322.92	12/64	33.8	6,626
IOWA (Calcasieu Par.)	Magnolia Petroleum Co.	B. T. Wait #14	10/27/40	364.68	12/64	36.4	8,439
	Magnolia Petroleum Co.	B. T. Wait #15	11/14/40	840.84	16/64	35.0	8,235
	Shell Oil Co.	F. Heyd (Iowa) #32	12/6/40	356.40	1/4	47.1	7,580
JEFFERSON ISLAND (Iberia Par.)	The Texas Co.	Jeff. Isl. Salt MCo. #6	10/14/40	259.20	10/64	35.2	8,854
JENNINGS (Acadia Par.)	Shell Oil Co.	Conover Comm. #12	10/19/40	321.00	12/64	36.2	7,855
	Gulf Refining Co.	Arnaudet #44	12/7/40	405.54	3/16	31.0	7,586
	The Texas Co.	Geo. H. Kerner #1	10/12/40	58.84	5/32	21.3	4,465
	Continental Oil Co.	Cal. Natl. Bank #3	10/6/40	288.36	7/32	54.6	9,962
LAKE SALVADOR (St. Charles Par.)	The Texas Co.	St. Lke. Salvador #2	11/9/40	455.00	3/16	32.9	10,201
	The Texas Co.	St. Lke. Salvador #3	12/21/40	637.00	3/16	33.0	10,235
LA PICE (St. James Par.)	Shell Oil Co. Inc.	Federal Ld. Bank #1	11/11/40	454.00	12/64	38.5	10,900
LA PLACE (St. John Baptist)	Pan American Prod. Co.	Mills #2	10/23/40	24.30	1/2	50.1	9,050
LEESVILLE (Lafourche Par.)	The Texas Co.	LL&E Leesville #76	11/3/40	267.78	3/16	39.0	8,778
	The Texas Co.	LL&E Leesville #77	11/14/40	486.84	3/16	35.7	8,602
	The Texas Co.	LL&E Leesville #78	12/24/40	399.60	12/64	39.0	8,650
	The Texas Co.	LL&E Leesville #79	12/31/40	453.60	12/64	37.5	8,650
NEALE (Beauregard Par.)	Atlantic Rfg. Co.	Ira Spiers #3	10/3/40	281.50	1/4	38.6	8,431
	Atlantic Rfg. Co.	Musser Davis #2	10/11/40	353.10	1/4	38.1	8,436
	Atlantic Rfg. Co.	Musser Davis Lbr. Co. #3	11/7/40	208.70	1/4	38.1	8,430
NORTH CROWLEY (Acadia Par.)	Humble Oil & Refg. Co.	Ohlenforst #9	10/16/40	486.84	3/16	35.3	8,600
	Vincent & Welch	Luther Harmon #2	10/16/40	275.88	9/64	37.0	8,903
	Humble Oil & Refg. Co.	P. J. Reiners #3	11/9/40	756.00	1/4	35.4	8,810
	Humble Oil & Refg. Co.	P. J. Reiners #4	12/3/40	768.92	1/4	34.1	8,805
	Humble Oil & Refg. Co.	F. Williams #9	12/26/40	649.20	3/16	35.4	8,606
PARADIS (St. Charles Par.)	The Texas Co.	LL&E Paradis #6	10/7/40	892.00	1/4	37.7	10,390
	The Texas Co.	LL&E Paradis #7	11/25/40	551.64	3/16	37.4	10,432
PLUMB BOB (St. Martin Par.)	The Texas Co.	St. Martin Land Co. #14	10/10/40	97.20	16/64	24.4	9,032
PORT BARRE (St. Landry Par.)	The Texas Co.	Botany Bay Lbr. Co. Inc. #30	10/10/40	665.00	1/4	37.3	6,144
	Pan Amer. Prod. Co.	H. L. Garland et al #7	12/18/40	369.84	12/64	38.9	5,900
POTASH (Plaquemines Par.)	Humble Oil & Refg. Co.	Orleans Lev. Bd. #47	11/16/40	640.40	1/4	28.3	8,030
QUARANTINE BAY (Plaquemines Par.)	Gulf Refg. Co.	La. State QQ #20	11/25/40	526.56	3/16	35.3	10,536
	Gulf Refg. Co.	La. State #23	12/15/40	453.00	3/16	34.1	?
	Gulf Refg. Co.	La. State QQ #24	12/31/40	441.00	3/16	35.0	8,490
RITCHIE (Acadia Par.)	Bering Oil Co.	Raymond McManus B1	12/6/40	147.42	5/32	25.8	3,518
SORRENTO (Ascension Par.)	F. O. Roshko	United Lands Co. #1	11/23/40	3.00	11/64	......	4,503
SOUTH CROWLEY (Acadia Par.)	Humble Oil & Refg. Co.	Michel Leger #2	10/19/40	470.64	3/16	35.1	9,072
	Humble Oil & Refg. Co.	F. B. Freeland et al #1	12/4/40	74.40	3/32	35.0	9,029
SULPHUR MINES (Calcasieu Par.)	Union Sulphur Co.	Fee #871	10/15/40	176.52	11/64	31.8	7,562
	Union Sulphur Co.	Fee #872	10/30/40	176.52	1/4	29.9	5,889
	Union Sulphur Co.	Fee #870	11/2/40	96.24	1/4	32.9	6,478
	Union Sulphur Co.	Fee #873	11/9/40	224.76	12/64	28.5	5,350
	Union Sulphur Co.	Fee #874	12/20/40	264.84	21/64	31.8	5,097
SWEET LAKE (Cameron Par.)	The Pure Oil Co.	Yount Lee Oil #19	10/9/40	390.00	14/64	30.6	7,391
	The Pure Oil Co.	Young Lee #20	12/13/40	300.00	12/64	28.9	5,356
UNIVERSITY (E. Baton Rouge Par.)	W. Helis et al	Nelson #9	10/13/40	213.78	10/64	34.7	6,775
	W. Helis et al	Duplantier C #4	10/29/40	175.00	10/64	35.0	....
	W. Helis et al	H. B. Nelson #10	11/8/40	243.48	10/64	34.7	7,169
	Superior Oil Corp.	Hatfield Comm. #1	11/25/40	172.50	10/64	34.8	7,242
	W. Helis et al	Nelson #11	12/7/40	243.48	10/64	34.7	6,794
VALENTINE (Lafourche Par.)	C. I. Production	Doussan #3	10/25/40	282.00	10/64	37.6	6,962
VENICE (Plaquemines Par.)	Tidewater Asso. Oil Co.	Manhattan Land & Frt. #13	11/27/40	194.00	1/8	30.9	7,750

Oil and Gas Wells Completed in South Louisiana During 4th Quarter of 1940

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Gravity	Total Depth
VILLE PLATTE (Evangeline Par.)							
	Continental Oil Co.	B. G. Fontenot Tr. #1, #4	10/11/40	570.00	1/4	39.6	10,160
	Continental Oil Co.	Adam Tate Tr. 9, #2	10/20/40	54.00	1/4	56.2	10,010
	Danciger Oil Co.	Oscar Pitre #1	10/28/40	262.00	12/64	39.3	10,232
	J. K. Hughes Oil Co.	Ortego #3	11/2/40	420.00	12/64	44.0	10,254
	Continental Oil Co.	Ed. Tate Tr. 4, #1	11/6/40	120.00	3/16	61.2	....
	Continental Oil Co.	Hattie Haas #6	11/7/40	744.00	1/4	36.6	....
	Continental Oil Co.	Lillie Tate #1	11/12/40	576.00	1/4	50.6	....
	Amerada Petroleum Co.	Mrs. Jules R. Foret #2	11/13/40	385.00	1/4	53.0	10,195
	Continental Oil Co.	N. H. Hirsch #6	12/4/40	396.00	1/4	42.8	8,995
	Continental Oil Co.	J. E. Vidrine Tr. 14, #4	12/9/40	132.00	1/4	51.8	10,020
	Gulf Refg. Co.	Mrs. Joe. Vidrine #1	12/10/40	528.00	1/4	41.1	10,109
	Continental Oil Co.	Evangeline Sec. Co. Tr2, #1	12/18/40	637.00	1/4	48.2	10,125
	Continental Oil Co.	Orise Deville tr. 3 #2	12/19/40	318.00	1/4	39.0	9,029
	Danciger Oil Co.	J. E. Vidrine #4	12/20/40	619.50	1/4	42.8	10,143
	J. K. Hughes Oil Co.	Oscar Pitre #2	12/21/40	498.84	1/4	47.0	10,142
VERMILION BAY (Iberia Par.)							
	The Texas Co.	State Vermilion Bay B4	10/24/40	469.80	10/64	32.2	10,818
WEST BAY (Plaquemines Par.)							
	Gulf Refg. Co.	T. G. Timolat B #1	12/14/40	732.00	3/16	34.2	7,286
WEST COTE BLANCHE BAY (St. Mary Par.)							
	The Texas Co.	St. West Cote Blanche #3	10/26/40	437.40	11/64	31.5	9,102
	The Texas Co.	State WCBB #6	12/27/40	64.80	8/64	32.2	7,854
WEST HACKBERRY (Cameron Par.)							
	Superior Oil Co.	Raymond Vincent et al 4	10/10/40	340.44	11/64	36.0	8,600
	Superior Oil Co.	Raymond Vincent et al 5	11/22/40	421.20	12/64	36.7	8,520
	Stanolind Oil & Gas Co.	State Land #57	12/8/40	240.72	3/16	31.5	9,755
WEST LAKE VERRET (St. Martin Par.)							
	Shell Oil Co.	St. Martin Ph. Sch. Bd. #1	10/21/40	235.00	13/64	......	8,974
	Shell Oil Co.	Jeanerette Lbr. Shg. #6	12/7/40	25.00 Dist.	14/64	49.0	8,982
WOODLAWN (Jefferson Davis Par.)							
	Union Sulphur Co.	F. Romero #1	11/26/40	176.65	10/64	35.7	9,809
	Union Sulphur Co.	E. A. Norton #3	12/10/40	240.72	1/4	36.2	9,316
WHITE CASTLE (Iberville Par.)							
	Shell Oil Co.	A. Wilbert Sons #18	11/18/40	456.00	16/64	30.1	7,000

Oil and Gas Wells Completed in North Louisiana During 4th Quarter of 1940

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Gravity	Total Depth
BULL BAYOU (De Soto Par.)							
	Pan-Southern Pet. Co.	Frank Groc. #1	10/18/40	23.37	Pumping	41.5	2,671
CADDO (Caddo Par.)							
	H. J. Strief	Noel Estate B-2	10/1/40	40.00	Open	40.0	1,515
	The Texas Company	Hicks-Payne #7	10/3/40	42.00	Pumping	40.0	1,602
	Rowland Savage et al	Mansfield Oil A-5	10/5/40	40.00	Pumping	40.0	1,540
	Stanolind Oil & Gas Co.	E. R. Dorian #3	10/5/40	8.00	Pumping	40.0	1,732
	L. L. Sugar	Hicks A-1	10/6/40	40.00	Pumping	40.0	1,650
	J. W. Bailey	Collins #3	10/7/40	4.00	Pumping	40.0	1,600
	A. R. Hancock	Standard Oil #11	10/9/40	20.00	Pumping	40.0	1,720
	James F. Kemp	N. B. Stoer et al #1	10/9/40	100.00	Open	40.0	1,525
	Magnolia Petroleum Co.	Doan Thigpen #26	10/11/40	30.00	Open	38.0	1,504
	Davis & Hart	Muslow #2	10/12/40	75.00	Pumping	40.0	1,504
	Rowland Savage	Mansfield Oil B-1	10/14/40	15.00	Pumping	40.0	1,539
	D. B. Burnett et al	Muslow #2	10/14/40	24.00	Pumping	?	1,500
	Chas. C. Lowery	R. E. Collins B-1	10/14/40	10.00	Pumping	42.0	1,585
	Ivan Wright	Moore #1	10/15/40	60.00	Open	?	1,530
	Tippett Oil Corp.	Thigpen Herold #4	10/15/40	100.00	Pumping	42.0	2,484
	Stiller-Perkins et al	W. P. Stiles #1	10/18/40	8.00	Pumping	42.0	2,372
	Red Bank Oil Co.	G. M. Solley #1	10/27/40	50.00	Pumping	41.0	1,510
	Midfield Oil Company	Muslow Oil Co. #3	10/30/40	140.00	Pumping	59.0	?
	La. Oil Prod. Company	Muslow #D-5	10/31/40	100.00	Pumping	39.0	1,504
	Magnolia Pet. Company	Doan Thigpen #27	11/1/40	5.00	Pumping	39.1	1,505
	W. H. Tyson & A. D. Dodd	Muslow Oil Co. D3	11/3/40	35.00	Pumping	39.5	1,595
	E. W. McGoldrick	Muslow #1	11/4/40	50.00	Pumping	39.0	1,515
	Magnolia Petroleum Co.	Doan Thigpen #28	11/5/40	50.00	Pumping	38.9	?
	Red Bank Oil Company	Hilda Woolhert #1	11/7/40	5.00	Pumping	39.3	1,520
	Magnolia Petroleum Co.	Doan Thigpen #29	11/11/40	15.00	Pumping	?	?
	Steeve Reele	Geo. W. Hardy #1	11/11/40	35.00	Pumping	39.1	1,588
	Elhert E. Johnson	Feist #1	11/14/40	60.00	Pumping	38.8	1,550
	Mahan & Griffin	Daniels #1	11/17/40	25.00	Pumping	34.0	?
	Juan & McFatrich	E. E. Hobbs #4	11/18/40	22.00	Pumping	39.0	1,530
	La. Oil Prod. Co.	Muslow #D-6	11/19/40	43.00	Open	38.7	1,535
	Magnolia Pet. Co.	Doan Thigpen #30	11/19/40	40.00	Open	39.3	1,507
	Midfield Oil Co.	Muslow C-1	11/19/40	40.00	Open	39.3	1,534
	Renwesk & Weskeyer	Stiles #2	11/20/40	75.00	Pumping	31.0	1,012
	Lydia Johnson	Lavine Murray #1	11/20/40	7.00	Pumping	39.3	1,538
	The Texas Company	W. A. Mabry et al #12	11/20/40	148.00	Pumping	40.5	1,647
	Gulf Refining Company	Elhert Tyson et al #16	11/21/40	38.00	Pumping	39.3	1,697
	J. W. Bailey	Muslow #1	11/24/40	35.00	Pumping	40.0	1,537
	A. R. Hancock	Std. Oil Co. #12	11/28/40	10.00	Pumping	?	?
	Lloyd A. Farr	W. F. Stiles Est. #8	12/1/40	25.00	Pumping	31.0	1,026
	J. W. Bailey	Muslow #2	12/3/40	43.00	Pumping	40.0	1,535
	The Texas Company	Heilperin Fee #7	12/3/40	40.00	Pumping	40.0	1,500
	Elhert E. Johnson	Rosenblath #1	12/7/40	37.00	Pumping	40.0	1,533
	James E. Kemp	E. E. Hobbs #2	12/8/40	40.00	Pumping	?	1,525
	Four Star Oil Co.	Muslow Oil Co. #4	12/12/40	35.00	Pumping	40.0	1,520
	Magnolia Pet. Corp.	Doan Thigpen #31	12/13/40	60.00	Open	39.4	1,521
	The Texas Company	Cullinan Fee #2	12/13/40	30.00	Pumping	40.0	?
	A. R. Hancock	Heilpern #7	12/16/40	10.00	Pumping	?	1,010
	McDonald & Campbell	Youree #17	12/16/40	50.00	Pumping	34.0	2,272
	L. A. Farr	Goodwin #2	12/21/40	20.00	Pumping	40.0	1,616
	Steve Reele	C. R. Ramsey #1	12/24/40	25.00	Pumping	40.0	1,597
	Gertrude McClanagan	Handschumacker #3	12/30/40	240.00	Open	40.0	1,635
	Pascal Ross	W. C. Tyrell et al #1	12/30/40	60.00	Pumping	40.0	1,512

Oil and Gas Wells Completed in North Louisiana During 4th Quarter of 1940

Field	Name of Company	Name of Well	Date Completed	Daily Initial Production	Size Choke (Inch)	Gravity	Total Depth
CONVERSE (Sabine Par.)	J. D. Haynes	Frost Lbr. Co. #1	10/17/40	16.44	Pumping	42.0	1,640
	J. W. Burrows	J. E. Middleton #1	10/19/40	43.00	Pumping	39.4	1,990
COTTON VALLEY (Webster Par.)	Magnolia Pet. Co.	Grant-Wadley #1	10/26/40	362.25	1/4	62.8	8,538
	Hunt Oil Company	Jordon et al #2	10/29/40	703.56	3/8	45.0	8,645
	Hunt Oil Company	J. Crawford & Booth #2	11/30/40	360.60	3/8	61.0	?
GEORGETOWN (Grant Par.)	R. D. Bevill, Jr.	Mrs. Swop et al #2	11/26/40	25.00	Pumping	21.0	1,604
JENA (La Salle Par.)	H. L. Hunt	Goodpine Lbr. #A-2	10/6/40	816.00	1/4	40.7	3,979
	H. L. Hunt (Discovery Well)	Goodpine A-3	10/26/40	336.00	19/64	30.6	4,364
	H. L. Hunt	Goodpine Oil #A-6	12/5/40	189.00	20/64	39.0	3,903
LOGANSPORT (De Soto Par.)	Union Prod. Co.	Mrs. M. E. Garrett B-1	10/14/40	⅛ MCF*	(Gas)	......	6,271
MONROE (Morehouse Par.)	Southern Carbon Co.	Ten Delta #33	10/11/40	2¾ MCF	(Gas)	......	2,200
	Southern Carbon Co.	Ten Delta #34	10/11/40	4¼ MCF	(Gas)	......	2,200
	Southern Carbon Co.	Ten Delta #35	11/7/40	3 MCF	(Gas)	......	2,200
MONROE (Ouachita Par.)	United Carbon Co.	Spades Fee #6	11/1/40	7 MCF	(Gas)	......	2,181
	Interstate Natl Gas Co.	State of La. A2 #102	11/12/40	3¾ MCF	(Gas)	......	2,160
	Interstate Natl Gas Co.	State of La. A4 #103	11/12/40	3 MCF	(Gas)	......	2,158
	Carbons Consolidated, Inc.	White #1	11/17/40	5½ MCF	(Gas)	......	2,113
	Carbons Consolidated, Inc.	White #2	12/16/40	7¾ MCF	(Gas)	......	2,200
MONROE (Union Par.)	Memphis Natl Gas Co.	Lankford #11	10/20/40	3 MCF	(Gas)	......	2,210
	Memphis Natl Gas Co.	Lankford #12	10/25/40	1 MCF	(Gas)	......	2,201
	Nemours Corporation	W. M. Gardner #1	11/9/40	1½ MCF	(Gas)	......	2,200
	Nemours Corporation	F. & I. Haile #1	11/9/40	2½ MCF	(Gas)	......	2,220
	Nemours Corporation	Joe M. Edwards #1	11/30/40	1¾ MCF	(Gas)	......	2,193
	Carbons Consolidated, Inc.	F. & I. Haile #1	12/9/40	7 MCF	(Gas)	......	2,200
OLLA (La Salle Par.)	Placid Oil Company	La. Central Lbr. #22	10/5/40	240.00	14/64	30.6	2,312
	Arkansas Fuel Company	Ada H. Hopkins #2	10/6/40	104.62	12/64	30.7	2,234
	Placid Oil Company	La. Central Lbr. #44	10/8/40	300.00	16/64	30.6	2,395
	Placid Oil Company	La. Central #39	10/11/40	182.00	14/64	30.6	2,479
	Placid Oil Company	La. Central #47	10/13/40	130.00	16/64	30.6	3,188
	Placid Oil Company	La. Central #49	10/14/40	200.00	16/64	30.7	2,402
	Placid Oil Company	La. Central #40	10/18/40	150.00	22/64	30.6	2,412
	Placid Oil Company	La. Central #30	10/19/40	140.00	1/4	30.6	2,442
	Placid Oil Company	La. Central #48	10/19/40	125.00	20/64	30.6	2,425
	H. L. Hunt	Urania Lbr. Co. #1	10/22/40	115.00	17/64	30.7	2,390
	Ark. Fuel Oil Company	Earl B. Nugent Unit A1	10/23/40	30.50	Various	33.0	2,365
	Placid Oil Co.	La. Central #53	10/25/40	235.00	18/64	30.6	2,430
	Placid Oil Co.	La. Central #50	10/26/40	150.00	20/64	30.6	2,430
	Placid Oil Company	La. Central #57	10/29/40	170.00	Open	31.0	2,402
	Placid Oil & Louark Prod.	Hopkins #1	11/4/40	297.00	13/64	30.8	2,384
	Placid Oil Company	La. Central #62	11/6/40	131.16	3/4	31.0	2,450
	Placid Oil Company	La. Central #54	11/7/40	225.00	14/64	30.6	2,398
	Placid Oil Company	La. Central #59	11/7/40	153.00	Open	31.0	2,438
	Arkansas Fuel Oil Co.	Mrs. Ida C. Matthews #1	11/8/40	120.23	1/4	32.0	2,222
	Placid Oil Company	La. Central #58	11/10/40	324.00	1/4	30.8	2,440
	Arkansas Fuel Oil Co.	F. M. Kees B-2	11/11/40	120.07	Open	30.7	2,240
	Placid Oil Company	La. Central #55	11/15/40	108.62	Open	31.6	2,423
	Placid Oil Company	La. Central #61	11/15/40	153.36	1/4	29.6	2,427
	H. L. Hunt	Goodpine Oil Co. A5	11/18/40	281.60	1/4	39.7	3,880
	Placid Oil Co.	La. Central #72	11/20/40	217.00	18/64	31.6	2,411
	Placid Oil Company	La. Central Lbr. Co. #67	11/20/40	408.96	Open	31.9	2,452
	Placid Oil Company	La. Central #56	11/23/40	259.20	10/64	30.6	2,403
	Arkansas Fuel Oil Co.	S. M. Cruse B-1	11/24/40	126.50	Open	33.2	2,220
	Placid Oil Company	La. Central Lbr. Co. #75	11/24/40	132.48	13/64	Open	2,413
	Placid Oil Company	La. Central #60	11/28/40	352.44	22/64	31.0	2,435
	Placid Oil Company	La. Central Co. #38	11/28/40	204.48	3/8	31.8	2,400
	Placid Oil Company	La. Central #71	12/1/40	437.00	20/64	31.0	2,379
	Placid Oil Company	La. Central Lbr. #51	12/4/40	240.00	20/64	32.0	2,414
	Placid Oil Company	La. Central Lbr. Co. #77	12/4/40	204.00	10/64	32.3	2,399
	Arkansas Fuel Oil Co.	J. D. Hopkins Unit B1	12/4/40	121.00	Open	32.2	2,258
	Placid Oil Company	La. Cent. Lbr. Co. #78	12/5/40	136.32	13/64	32.0	2,396
	Arkansas Fuel Oil Co.	Y. W. Flowers A-1	12/9/40	143.00	1/8	32.4	2,232
	Placid Oil Co.	La. Cent. Lbr. Co. #79	12/15/40	170.00	12/64	32.0	2,407
	Placid Oil Co.	La. Cent. Lbr. Co. #70	12/16/40	204.00	18/64	32.0	2,400
	Placid Oil Co.	La. Cent. Lbr. Co. #52	12/18/40	375.00	18/64	32.0	2,427
	H. L. Hunt	Goodpine Oil Co. A7	12/18/40	352.00	12/64	39.2	3,891
	Arkansas Fuel Oil Co.	Goodpine Oil Co. C2	12/19/40	168.00	16/64	32.0	2,231
	Arkansas Fuel Oil Co.	F. M. Kees C-1	12/27/40	97.20	Pumping	32.7	2,215
PINE ISLAND (Caddo Par.)	Gulf Refg. Co.	J. H. Herndon et al #11	10/23/40	148.00	Open	39.3	1,504
	Stanolind O&G Co.	C. W. Lane #1	11/5/40	1.50	Pumping	37.9	1,652
	Gulf Refg. Co.	J. H. Herndon et al #12	11/20/40	1000.00	Open	39.3	1,550
	Gulf Refg. Co.	J. H. Herndon et al #13	11/29/40	737.00	Open	39.5	1,647
	Gulf Refg. Co.	J. H. Herndon et al #14	12/6/40	700.00	Open	40.0	1,639
	Gulf Refg. Co.	W. H. Wadkins #9	12/18/40	125.00	Pumping	40.0	1,596
	Gulf Refg. Co.	E. Tyson et al #17	12/26/40	90.00	Pumping	39.3	1,735
	The Texas Co.	D. H. Raines #23	12/30/40	10.00	Pumping	39.8	1,745
SLIGO (Bossier Par.)	Triangle Drilling Co.	Chatman #3	10/26/40	100.00	1/2	40.0	3,145
SUGAR CREEK (Claiborne Par.)	Sugar Creek Syn. et al	Carter #2	12/4/40	210.60	1/4	31.0	6,037
TULLOS (La Salle Par.)	P. E. Trichell	McDoughty #1	10/1/40	14.90	Pumping	19.0	1,428
VIVIAN (Caddo Par.)	Woodley Co., Inc.	S. L. Browning #1	11/23/40	25.00	Pumping	......	2,466

* MCF—As used in this table for convenience, means—Million Cubic Feet of Gas.

An Important Message to the Readers of the Louisiana Conservation Review

Due to continually increasing requests from people in all parts of the nation to be placed on the mailing list of the **LOUISIANA CONSERVATION REVIEW,** it becomes necessary to determine as soon as possible the actual number of those at present on our mailing list, who are interested in the subject of **CONSERVATION** and want the magazine to be continued to be sent them.

The present mail circulation of the **LOUISIANA CONSERVATION REVIEW** is over 25,000. Many of these names have been on the Review mailing list for years. Thousands of new requests for copies of the Review have been received during the past few months, and in line with the policy of the Department of Conservation to serve citizens of Louisiana and others throughout the nation interested in conservation and natural resources of Louisiana, these requests have been filled. As long as the magazine continues subscription-free this policy will undoubtedly be continued.

However, in an effort to fill the many thousands of new requests, without increasing present costs, if possible, we desire to eliminate from our mailing list, those who frankly are not interested in receiving the Review and are not interested in conservation. For that reason there has been printed on the bottom of this page a coupon, which we request each reader to fill out and mail to us.

WITHIN 60 DAYS FROM THE DATE THIS ISSUE OF THE REVIEW IS MAILED, WE WILL DISCONTINUE THE NAMES ON OUR MAILING LIST OF ALL THOSE FROM WHOM WE HAVE NOT RECEIVED ANY RESPONSE.

Obviously this request is a reasonable one. It will take only a minute or two to fill out the form below, and we have every reason to assume that those who are really interested in the subject, will take the little time required to give us this information.

To the thousands of our readers who responded to a similar card inquiry several months ago, we extend our thanks, and our apologies for asking that they let us hear from them again.

Louisiana Conservation Review

126 CIVIL COURTS BUILDING **NEW ORLEANS, LA.**

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BE SURE

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MESSAGE

ON THE

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OF THIS PAGE

From the barefoot boy, fishing with line and pole in the perch hole of the homestead creek, to the rod-and-reel sportsman, fishing for Speckled Trout, Redfish, Sheepshead, King Mackerel or Tarpon, in the salt waters off-shore, there is no outdoor sport or recreation that interests so many of our people.

Fishing ranks ahead of football, baseball, golf and tennis in the numbers who enjoy its wholesome diversion, drawn from every walk of life. In the money expended for fishing togs and tackle, bait, transportation, etc., it is a major item of BIG BUSINESS.

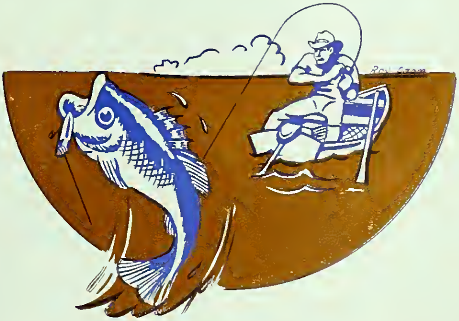
In the extent and variety of its fishing waters no State is the equal of Louisiana. This is explained by the geological history of the State, the formation of its thousands of inland lakes, lagoons and bayous, its long coast line and indenture of bays and estuaries.

Out of 31,000,000 acres within the boundaries of Louisiana approximately 2,000,000 acres are under water, so that theoretically every man, woman and child in the State is entitled to an acre of water in which to fish.

The Mississippi River has not only drawn on the upper reaches of the Continent for the rich alluvial silt that constitutes the top soil of Louisiana land; the fishing waters here have been supplied with River-borne food elements that provide the sustenance of a great variety of fresh and brackish water fish.

This is an asset that contributes to the continued diversion and happiness of our own people and attracts thousands of visitors from all parts of the country.

With better transportation, more automobiles and concrete highways, America is increasingly travel-minded—in the immediate years to come "LOUISIANA FISHING" will be the magnet that draws America in this direction.



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10